West Berkshire Minerals and Waste Local Plan

Minerals Evidence Paper

November 2020

West Berkshire Local Plan

West Berkshire Council

For enquiries relating to this policy, contact:

Tel 01635 519747
Email: dp@westberks.gov.uk

For information and enquiries relating to the content of this document, please contact the Minerals and Waste Team:

Tel: 01635 519111
Email: mwdpd@westberks.gov.uk
Post: Minerals and Waste Team, Planning and Transport Policy, Development and Planning, Market Street, Newbury, West Berks, RG14 5LD

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1.1.1 The government requires that mineral planning authorities should plan for a steady and adequate supply of construction aggregates by preparing an annual Local Aggregate Assessment (LAA) based on a rolling average of 10-years' sales data and other relevant information, and an assessment of all supply options (including marine dredged, secondary and recycled sources).

1.1.2 The most recent LAA (2020) investigated whether future demand, environmental constraints or other local circumstances should justify a departure from the 10 year sales average. The LAA concluded that the decline in land-won aggregate producing sites and reserves in West Berkshire has been considered to have supressed sales in relation to demand in recent years and particularly again in 2019. This is due to the fact that only two sites were operational in 2019 and, of these two, one was worked out in 2019, and the other is nearing the end of its available reserves. Therefore, consistent with the 2019 LAA, it is considered that relying on the past 10 year sales average may not be sufficient to plan for a steady and adequate supply of sand and gravel West Berkshire. Due to this, as proposed in the 2019 LAA, it is recommended that the 2018 LAA rates should remain in place (189,233 tpa for sharp sand and gravel and 43,730 tpa for soft sand). This situation will need to be monitored in future to determine whether these rates remain appropriate, particularly if additional sites become operational and levels of sales again increase.

1.2 Land-won Sand and Gravel

1.2.1 The geology in West Berkshire produces the following type of construction aggregates:

- Sharp Sand and Gravel (suitable for most types of concreting purposes)
- Soft Sand (also called building sand, suitable for mortars, plasters and asphalt)

1.2.2 The level of need for soft sand in West Berkshire has always been an issue for the authority because of past confidentiality agreements, and the fact that much of the northern area of West Berkshire, where the main deposits of soft sand have historically been worked, lies within the North Wessex Downs Area of Outstanding Natural Beauty (AONB). However, since 2016 agreement has been obtained from relevant mineral operators to publish separate soft sand and sharp sand and gravel sales figures which has enabled separate reporting of soft sand sales, landbank and requirement figures meaning a more accurate representation of the amount required to be planned for in the MWLP is able to be made.

1.2.3 Due to the fact that major development, including major minerals development should not be permitted within the AONB except in 'exceptional circumstances', the Council have commissioned a specific 'Soft Sand Study' to look into all alternatives for providing for the need for soft sand within the district. The results of that study and recommendations for delivering the need for soft sand is outlined in a separate Soft Sand Topic Paper.

1.2.4 Sales of land won aggregates in West Berkshire have been declining over the past decade, and this is reflected in the 10 year sales average which has been declining in turn. In 2019 it was 128,581 tonnes for sharp sand and gravel and 27,652 tonnes for soft sand (156,233 tonnes for combined sand and gravel); these are the lowest levels

reported by the authority's LAAs. As already mentioned, it is recommended that the 2018 LAA rates should remain in place (189,233 tpa for sharp sand and gravel and 43,730 tpa for soft sand). Reserves of sharp sand and gravel were 2,567,500 tonnes at the end of 2019, and there were no reserves of soft sand, resulting in respective 'landbanks' (permitted reserve divided by the annual requirement) of 13.6 years for sharp sand and gravel and 0 years for soft sand. Councils are required to maintain landbanks of 7 years for sand and gravel, and therefore these landbank figures indicate a pressing need for soft sand. In addition, it has to be noted that for sharp sand and gravel, the majority of reserves are located in a single site that has been implemented but has yet to commence production.

1.2.5 An analysis of the requirements over the Plan period has showed that an additional 840,000 tonnes of sharp sand and gravel, and an additional 790,000 tonnes of soft sand will be required to 2037. An analysis of available production capacity has shown that current production capacity is insufficient to deliver the annual requirement for sharp sand and gravel and soft sand, also indicating a need for additional supplies of these aggregates in order to maintain a steady and adequate supply of aggregates as required by the NPPF.

1.3 Recycled and Secondary Aggregates

1.3.1 Recycled aggregates are obtained from the processing of construction and demolition waste and secondary aggregates are aggregates derived as a by-product of other quarrying, mining or industrial operations. A predominant source of recycled aggregates includes waste arising from the construction and demolition sector - for example bricks, concrete, tiles, soil and stones. There are no known sources of notable secondary aggregates within West Berkshire although in 2019, 22,290 tonnes of substandard blocks from Forterra Thermalite were used in the manufacture of concrete blocks.

1.3.2 The level of recycled aggregates estimated to have been produced, and also proportion consumed within West Berkshire is understood to have increased over the past decade.

1.3.3 The level of output of recycled aggregates in 2019 was 344,645 tonnes, which is significantly above the estimated level of consumption of recycled aggregates in West Berkshire of 180,654 tonnes (2018). Therefore, it is estimated that the volume of recycled aggregates produced in West Berkshire is supporting a demand that extends beyond the authority area. The overall operational aggregate recycling capacity in West Berkshire in 2019, as indicated by industry surveys is estimated at 669,250 tonnes, which is above current levels of sales indicating that there does not appear to be an issue with the balance of supply to deliver the demand for recycled aggregates in West Berkshire. However, it will be important to safeguard existing recycled aggregate facilities in order to ensure that the security of supply is maintained and available to increase in future.

1.3.4 The NPPF requires that so far as is practicable, account should be taken of the contribution that secondary and recycled materials can make to the supply of materials, before considering extraction of primary materials. Therefore, it is considered prudent to use the highest sales figure (three year sales average) for recycled aggregates of 328,637 tonnes in planning for the supply of recycled aggregates.

1.4 Rail Imported Crushed Rock and Marine Aggregates

1.4.1 West Berkshire imports crushed rock and marine sand and gravel into the rail depots at Theale. This is due to there being no indigenous sources of crushed rock or marine landing wharves in the district. Sales and consumption of both aggregates have been increasing in recent years.

1.4.2 Crushed rock is mainly imported from Somerset, and no supply issues have been identified with this arrangement. Marine sand and gravel is mainly imported by rail from wharves in London and although no supply issues have been identified with this arrangement, the safeguarding of wharves and railheads in London will be critical to ensuring the capacity to export these materials is maintained.

1.4.3 Aggregate rail depot capacity in Theale has increased recently, due to a depot site previously importing cement beginning to import raw aggregates. Capacity at the depots is above current sales, with approximately 70,000 tonnes of headroom capacity. This suggests that the supply of aggregates through rail importation in West Berkshire is unlikely to be constrained by depot capacity. However, safeguarding these facilities in the Minerals and Waste Local Plan will be critical to ensuring this capacity is available over the Plan period and ensure that recent levels of supply can continue and increase if necessary.

1.5 Energy Minerals

1.5.1 There are understood to be deposits of energy minerals that exist, at some depth, within the geographical area of West Berkshire. These deep coal deposits have never been actively worked and, at this stage, it is considered unlikely that these deposits will become viable, and therefore actively exploited over the plan period.

1.5.2 There is also limited potential for unconventional energy minerals to exist beneath, or be accessed from, West Berkshire. Due to the emergence of the new technologies to exploit such deposits it is possible that, over the life of the plan, deposits that are currently unviable become more viable.

1.5.3 However, conventional and unconventional exploration and production of oil and gas can only be undertaken in areas that are licensed by the Oil and Gas Authority. There are no current licenses in West Berkshire.

1.5.4 Despite the fact the likelihood of the exploitation of these mineral deposits is considered limited it is important that the MWLP includes adequate policies to ensure that any applications that may be forthcoming can be adequately considered and determined.

1.6 Chalk and Clay

1.6.1 There are known to be extensive deposits of both chalk and clay across large areas of West Berkshire. However, despite the extent of these deposits there are currently no active workings that extract these minerals from sites within West Berkshire.

1.6.2 Chalk deposits are located in the north of West Berkshire. Historically pulverised chalk has been used as a liming agent for agricultural land, and sometimes as ‘fill’ material in civil engineering projects. Much of the area where the chalk deposits exist are located within the North Wessex Downs AONB.

1.6.3 Clay deposits (London Clay) are located along the Kennet Valley to the east of Thatcham, with some more limited areas surrounding Newbury to the north, west and south and have historically been used for brick and tile making, and more latterly for lining landfill sites.

1.6.4 Despite the fact the likelihood of the exploitation of these mineral deposits is considered limited it is important that the MWLP should include adequate policies to ensure that any applications that may be forthcoming can be adequately considered and determined.

2.0 Introduction

2.0.1 The NPPF confirms that Minerals are essential to support sustainable economic growth and quality of life. It is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs. However, since minerals are a finite natural resource, and can only be worked where they are found, it is important to make best use of them to secure their long-term conservation.

2.0.2 This evidence document therefore considers those minerals that are known to exist within the geographical area of West Berkshire and, using the evidence available, suggests a policy approach so that the emerging West Berkshire Minerals Local Plan (MWLP) adequately plans for the identified minerals.

2.0.3 Sections 3-6 of this report relate to construction aggregates (including both primary aggregates as well as recycled and secondary aggregates). Section 7 of the report refers to energy minerals, with the section 8 relating to other non-energy minerals known to exist in West Berkshire (namely chalk and clay).

3.0 Land Won Primary Aggregates

3.1 Background

3.1.1 The government requires that mineral planning authorities should plan for a steady and adequate supply of construction aggregates by preparing an annual Local Aggregate Assessment (LAA). The NPPF confirms that LAAs should be based on rolling 10-year sales data and other relevant information, and an assessment of all supply options (including marine dredged, secondary and recycled sources).

3.1.2 Local Aggregate Assessments have been produced by West Berkshire Council since 2013. The LAA's main function is to predict and review the demands placed upon primary minerals in West Berkshire to ensure that West Berkshire Council can provide a steady and adequate supply; and consider the need for the provision of an appropriate aggregate mineral landbank over the projected plan period.

3.1.3 All the LAAs produced by West Berkshire Council were created, in part, to inform the formulation of the West Berkshire Minerals and Waste Local Plan (projected to cover the period to 2037). The first LAA produced by the Council in 2013 (2013 LAA) was also developed as a key evidence base document that supported the development of the Issues and Options consultation stage of the MWLP.

3.1.4 The 2013 LAA was therefore extensive and considered a range of issues and factors considered to be relevant to the determination of the level of need for minerals in West Berkshire. The 2013 LAA also considered various different ways to project the level of need for minerals moving forward. Having considered various factors, the 2013 LAA determined that the most appropriate methodology for projecting future demand for primary construction aggregates to be won from within the authority was the use of a 10 year average of past sales. The 2013 LAA also identified that West Berkshire has historically been a significant producer of sand and gravel, which has been exported to neighbouring authorities. However, sales of sand and gravel have declined in West Berkshire in recent years, such that it is understood that far more limited amounts are now available for export.

3.1.5 The subsequent LAAs produced by West Berkshire continued to use the same methodology (10 year average of sales) as the projected method for projecting future need for land won primary construction aggregates until the 2019 LAA. From this year, the decline in land-won aggregate producing sites and reserves in West Berkshire has been considered to have supressed sales in relation to demand. This is due to the fact that only two sites were operational in 2019, and of these two, one was worked out in 2019, and the other is nearing the end of its available reserves. Therefore, it is considered that relying on the past 10 year sales average may not currently be sufficient to plan for a steady and adequate supply of sand and gravel West Berkshire. Due to this, it is recommended that the 2018 LAA rates should remain in place (189,233 tpa for sharp sand and gravel and 43,730 tpa for soft sand).

3.1.6 This Minerals Evidence Paper has been updated in preparation of the ‘Proposed Submission’ version of the MWLP, and has been informed by the 2020 LAA. An LAA is always based on the previous years’ sales data, and therefore the 2020 LAA reports on data from the 2019 calendar year. This Minerals Evidence Paper has also been heavily informed by the LAAs already produced by West Berkshire, which follow the approach set out in paragraph 207 of the National Planning Policy Framework

(NPPF)[1] and the Planning Practice Guidance on the Managed Aggregate Supply Systems[2]. The document also draws on information contained in a companion document, the Local Waste Assessment (2020), also prepared by West Berkshire Council.

3.1.7 The LAAs produced by West Berkshire have all identified that there is a need for new mineral supply in West Berkshire to meet the ongoing demand for construction aggregates. As such the MWLP will include the allocation of areas for mineral extraction to ensure that West Berkshire can maintain a steady and adequate supply of minerals to meet the needs of West Berkshire. The 'Proposed Submission' MWLP consultation, which this evidence document supports, identifies allocated sites, where it is considered that mineral extraction will cause the least harm when balanced against the wider sustainability and environmental objectives.

3.1.8 It is possible that planning applications for mineral extraction could come forward prior to adoption of the MWLP. In such instances, proposals will be tested against the "saved" policies in the Replacement Minerals Local Plan for Berkshire including the alterations adopted in 1997 and 2001 (RMLP). Paragraph 213 of the NPPF states that *"*Due weight should be given to them, according to their degree of consistency with this Framework (the closer the policies in the plan to the policies in the Framework, the greater the weight that may be given)".

3.2 Primary Aggregates in West Berkshire

3.2.1 The bedrock geology of West Berkshire is characterised by four main geological formations: Bagshot Beds, Reading Beds, London Clay and Chalk.

3.2.2 The superficial geology of West Berkshire includes deposits of sand and gravel comprising:

- Plateau Gravel
- Valley Gravel

3.2.3 The geology in West Berkshire produces the following type of construction aggregates:

- Sharp Sand and Gravel (suitable for most types of concreting purposes)
- Soft Sand (also called building sand, suitable for mortars and plasters)

3.2.4 Geologically speaking, sharp sand and gravel is a very recent deposit. It is predominantly found along the Kenner River valley, and also in river terrace deposits, which are the remnants of raised floodplains. Soft sand is much older, and in West Berkshire it principally occurs in the Reading Formation, a bedrock deposit outcropping in the higher ground above the Kennet Valley. The Formation is predominantly clay bearing, but also contains sand beds.

3.2.5 Much of the northern area of West Berkshire, where the main deposits of soft sand have historically been worked, lies within the North Wessex Downs Area of Outstanding Natural Beauty (AONB).

3.2.6 Information on the general extent of the deposits of sand and gravel, chalk and clay in West Berkshire is shown in the simplified geological map in Figure 3.0.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf
[2] https://www.gov.uk/government/collections/planning-practice-guidance

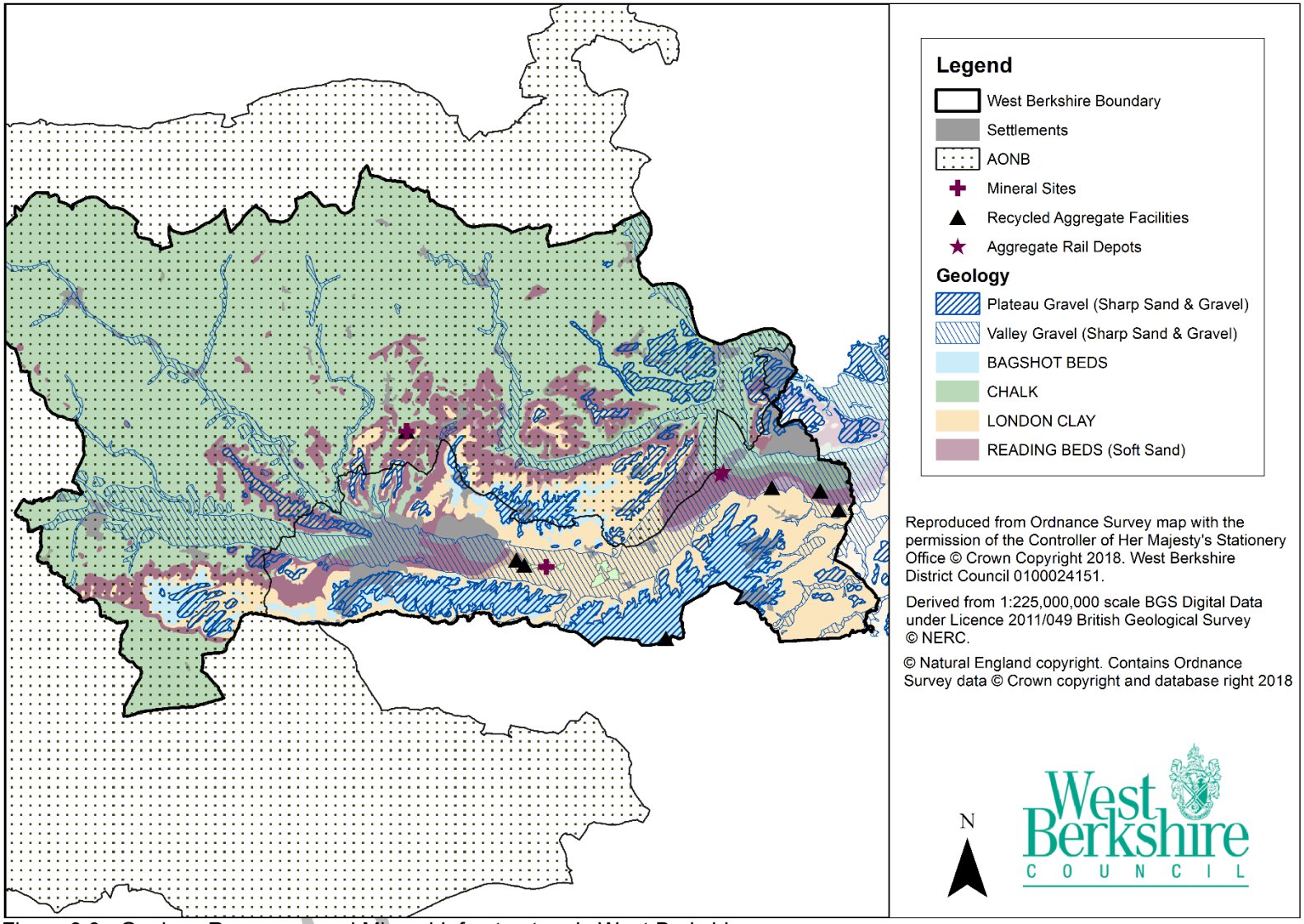

Figure 3.0 - Geology Resources and Mineral Infrastructure in West Berkshire

3.3 Soft Sand

3.3.1 The level of need for soft sand in West Berkshire has always been an issue for the authority, and therefore is a matter that the MWLP will need to address. Due to commercial confidentiality agreements between the authority and minerals industry, the sharp sand and gravel sales and soft sand sales have historically been combined. However, since 2016, agreement has been gained from relevant minerals operators to publish separate soft sand and sharp sand and gravel sales figures. This has enabled separate reporting of soft sand sales, landbanks and requirement figures, meaning a more accurate representation of the supply situation for this aggregate within West Berkshire can be gained, as well as a more accurate estimate of the amount required to be planned for in the MWLP.

3.3.2 Another consideration for the authority in planning for soft sand, is the fact that much of the northern area of West Berkshire, where the main deposits of soft sand have historically been worked, lies within the North Wessex Downs Area of Outstanding Natural Beauty (AONB). Whilst mineral extraction is not excluded from such areas the NPPF states that, when determining planning applications for major development (including major mineral development) in Areas of Outstanding Natural Beauty, National Parks and The Broads, great weight should be given to the conservation of the landscape and scenic beauty, as well as conservation of wildlife and cultural heritage, and that permission should not be granted unless in exceptional circumstances, and where it can be demonstrated to be in the public interest. The NPPF also confirms that landbanks of non-energy minerals (including construction aggregates) should, as far as is practical, be maintained from sites outside such national level designations.

3.3.3 Consideration of all supply options will therefore need to be undertaken in demonstrating whether exceptional circumstances exist such as to justify allocating sites within the AONB. The Council has commissioned a specific 'Soft Sand Study' to look into all alternatives for providing for the need for soft sand within the district, including:

Option 1: Allocate specific sites for soft sand, including from within the AONB. Future planning applications would have to pass the exceptional circumstances test in the NPPF.

Option 2: Do not allocate specific sites within the AONB – work with surrounding authorities and/or rely on alternative sources (e.g. marine sand) to secure supply.

Option 3: Do not allocate specific sites within the AONB - identify preferred areas, or areas of search outside of the AONB.

Option 4: Combination of options 1 and 3. Seek to allocate the most appropriate specific sites (whether within the AONB or not) and where this is not sufficient to deliver the requirement over the plan period, identify preferred areas or areas of search outside of the AONB.

Option 5: Do not allocate specific sites in the AONB - identify preferred areas, or areas of search both within and outside of the AONB.

3.3.4 The results of that study and recommendations for delivering the need for soft sand are outlined in a separate Soft Sand Topic Paper. Therefore, this Minerals Evidence Paper will deal solely with identifying the required need for soft sand to be planned for in the MWLP.

3.4 Production/Sales

3.4.1 Due to a combination of factors, West Berkshire is in the position whereby it is not always possible to refer back to actual records of past outputs / sales from the primary aggregate extraction sites in West Berkshire, particularly prior to 2013. This is because the surveys carried out and results published were undertaken jointly by the 6 unitary authorities that make up Berkshire. Therefore, when developing LAAs for West Berkshire, an analysis of historical aggregate production has had to be undertaken to establish an estimated sales figure for the years prior to 2012, using the following available alternative sources:

- Planning application forms,
- Written submissions accompanying planning applications,
- Proofs of evidence supporting planning appeals,
- Letters from site operators,
- Site visit photographs,
- Site visit notes (including notes of conversations with site managers),
- Aerial photography,
- Returns information provided by a mineral operator,
- Annual Monitoring Reports produced by the JSPU,
- Annual Monitoring Reports produced by the South East England Aggregates Working Party, and
- Aggregates Monitoring report for Berkshire 2011.

3.4.2 Since the publication of the 2013 LAA, the Council has undertaken operator surveys to document the actual outputs from sites since 2012. Each survey also allows review and re-evaluation of the landbank calculations and 10 year average production figures. Therefore the figures presented in this evidence document may not always align precisely to preceding LAAs.

3.4.3 Due to commercial confidentiality agreements between the authority and minerals industry, sand and gravel sales and soft sand sales, prior to 2016, have been combined. Since 2016, agreement has been gained from relevant minerals operators to publish separate soft sand and sharp sand and gravel sales figures. However, previous sales figures are still combined to protect the confidentiality of past operators.

3.4.4 The past 10 years' sales of sharp sand and gravel and soft sand are shown in Table 3.1 and represented in Figure 3.1, and the 10 year and 3 year sales averages are shown in Table 3.2.

Table 3.1 **-** Past 10 Year Construction Aggregate Outputs in West Berkshire

Year	Sharp Sand and Gravel	Soft Sand	Total
2010	confidential	confidential	264,614
2011	confidential	confidential	244,975
2012	confidential	confidential	234,006
2013	confidential	confidential	198,745
2014	confidential	confidential	157,205
2015	confidential	confidential	152,188
2016	104,990	7,185	112,175

2017	81,993	2,054	84,047
2018	33,177	21,792	54,969
2019	42,883	16,530	59,413

Source: West Berkshire Council Aggregates Monitoring Surveys

Table 3.2 – Ten and 3 Year Averages for Land Won Sharp Sand and Gravel and Soft Sand

2010 - 2019	10 Year Sales Average	3 Year Sales Average
Sharp Sand and Gravel	128,581	52,684
Soft Sand	27,652	13,459
Combined	156,233	66,143

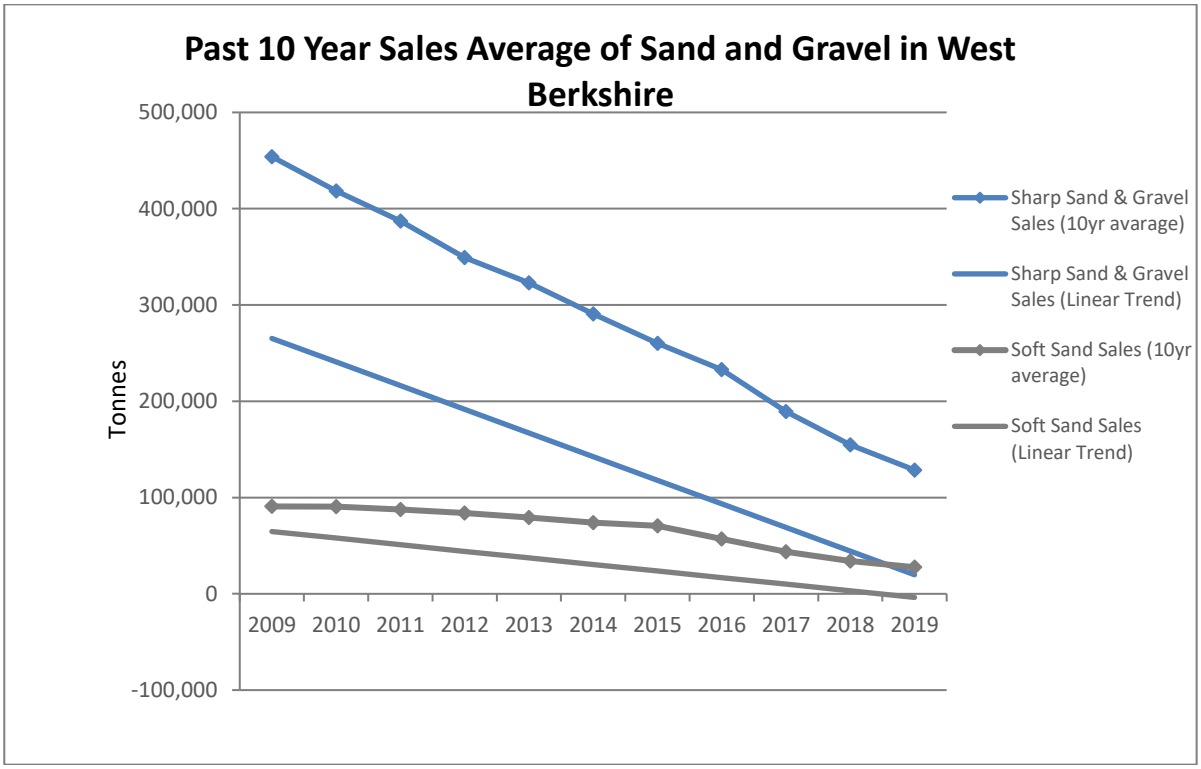

Figure 3.1 - Linear Trend for Past 10 Years Sales and Actual 10 Year Average Sales of Sharp Sand and Gravel and Soft Sand in West Berkshire. Source: West Berkshire Council.

3.4.5 Figure 3.1 illustrates that sales of sharp sand and gravel and soft sand have been declining in recent years. It also demonstrates that the level of sales of primary aggregates won from sites in West Berkshire has consistently been below the 10 year average of sales and that the rolling 10 year average of sales has been declining in recent years.

3.4.6 The pattern of primary aggregate output decline in West Berkshire generally reflects the pattern of overall decline in primary aggregate outputs seen in the wider South East from 2008 - 2013. However, in recent years (2013 – 2018) sales in the South

East have been increasing[3], whereas sales in West Berkshire have continued to fall. This is likely due to the closure of extraction sites and depletion of reserves in the remaining sites in the district.

3.4.7 The NPPF requires that in planning for a steady and adequate supply of aggregates, this should be based on a rolling average of 10 years' sales data, other relevant local information, and an assessment of all supply options. The 2020 LAA investigated whether future demand, environmental constraints or other local circumstances should justify a departure from the 10 year sales average. The LAA concluded that the decline in land-won aggregate producing sites and reserves in West Berkshire has been considered to have supressed sales in relation to demand in recent years and particularly again in 2019. This is due to the fact that only two sites were operational in 2019, and of these two, one was worked out in 2019, and the other is nearing the end of its available reserves. Therefore, it is considered that relying on the past 10 year sales average may not be sufficient to plan for a steady and adequate supply of sand and gravel West Berkshire and the 2018 LAA rates should remain in place (189,233 tpa for sharp sand and gravel and 43,730 tpa for soft sand). These figures have been used as the basis for forecasting future need for construction aggregates in the MWLP.

3.5 Imports/Exports

3.5.1 There are cross boundary movements of construction aggregates which are dictated by market demands, ensuring that the types of aggregates available to the local construction industry are in line with the types of aggregates that it needs, at the time it is needed and in the quantity required. For example, the geological composition in West Berkshire means that the area needs to import supplies of crushed rock, as there are no sources of crushed rock in the authority area. In general, however, it is assumed that each Mineral Planning Authority is working to ensure a degree of net self-sufficiency of mineral provision within their authority area which allows for relevant amounts of mineral to move across boundary areas to meet specific market demands.

3.5.2 Import/export data is only available every 4 years when data is published by the Department for Communities and Local Government as part of the Aggregate Minerals (AM) survey undertaken by the British Geological Survey (BGS), the most recent being in 2014. The data from these surveys is generally only reported at the Berkshire-wide level and sand and gravel data is combined – soft sand is not reported separately. This makes the data from within these surveys of limited use for plan-making in West Berkshire and the other 5 authorities comprising the former county of Berkshire. However, it does allow a broad level of analysis to be made.

3.5.3 The sources of land won sand and gravel consumed in Berkshire are shown in Table 3.3. Clearly, a high proportion of sand and gravel consumed was from Berkshire itself (West Berkshire and Windsor and Maidenhead). The main sources of sand and gravel from outside the county were Hampshire, Wiltshire and Oxfordshire – all neighbouring authorities.

Table 3.3 - Sources of Land Won Sand and Gravel Consumed in Berkshire 2014

Source MPA	Percentage	Tonnes
Indigenous		

[3] South East England Aggregates Monitoring Report, 2018. South East England Aggregates Working Party Report.

Berkshire		
West Berkshire	20-30%	120,200 – 180,300
Windsor and Maidenhead	20-30%	120,200 – 180,300
Imports		
South East		
Hampshire	10-20%	60,100 – 120,200
Oxfordshire	10-20%	60,100 – 120,200
Surrey	1-10%	6,010 – 60,100
Buckinghamshire	1-10%	6,010 – 60,100
Kent	<1%	<6,010
South Downs National Park,	<1%	<6,010
West Sussex	<1%	<6,010
Elsewhere		
Wiltshire	10-20%	60,100 – 120,200
Gloucestershire	1-10%	6,010 – 60,100
Cambridgeshire	1-10%	6,010 – 60,100
Hertfordshire	1-10%	6,010 – 60,100
Devon	<1%	<6,010
Central Bedfordshire	<1%	<6,010
Essex	<1%	<6,010
Total Consumption		**601,000**
Total Imports		**353,000**

Source: AM 2014 Source of Primary Aggregates by Sub-region – Percentage Categories (2016), BGS

3.5.4 The destinations of sand and gravel exports from West Berkshire in 2014 are shown in Table 3.4. It can be seen that the majority of exports from West Berkshire are consumed elsewhere in Berkshire or elsewhere in the South East, with smaller amounts being consumed in Hampshire, Surrey, Oxfordshire, Wiltshire and Swindon, Warwickshire, London and West Sussex.

Table 3.4 – Sand and Gravel Exports from West Berkshire in 2014

Destination of Minerals Won from West Berkshire	Tonnes
Berkshire	120,116 – 180,249
Unknown but somewhere in the South East	7,690 – 76,900
Hampshire and the Isle of Wight	<8,820
Surrey	<7,630
Oxfordshire	<7,590
Wiltshire and Swindon	<5,390
Warwickshire	<4,750
Unknown but somewhere in Greater London	<1,280
West Sussex	<990

Source: AM 2014 Source of Primary Aggregates by Sub-region - Percentage Categories (2016), BGS.

3.6 Consumption

3.6.1 Consumption is the amount of aggregate 'used' within a Mineral Planning Authority Area. Together, the sales, imports and exports generate total consumption within a Mineral Planning Authority area (primary sales + imports – exports = total consumption).

3.6.2 Consumption figures for primary aggregates, including land won sand and gravel can only be obtained every four years when import/export data is published by the Department for Communities and Local Government as part of the Aggregate Minerals (AM) survey undertaken by the British Geological Survey (BGS). The most

recently undertaken survey was in 2014. Additionally, this data is not available at the West Berkshire level as the main reporting unit is for the former county of Berkshire.

3.6.3 The most recent survey indicates that consumption of land-won sand and gravel has decreased on a Berkshire-wide level from 2009 to 2014 (from 807,000 tonnes to 601,000 tonnes). Although these figures are only accurate at a Berkshire-wide level it is probable that West Berkshire has generally followed this trend. It is also possible to estimate consumption of sand and gravel within West Berkshire based on its proportion of the Berkshire-wide population in 2009 (18.0%) and 2014 (17.7%). This equates to 145,620 tonnes of land-won sand and gravel consumed within West Berkshire in 2009, and 106,377 tonnes consumed in 2014 (Table 3.5).

Table 3.5 - Estimates of Sand and Gravel Consumption in West Berkshire 2009 and 2014.

Sand and Gravel Consumption	2009	2014
Berkshire – AM Survey Total	807,000	601,000
West Berkshire – Proportion of Berkshire Estimate (based on AM survey)	145,620	106,377

Source: Collation of the Results of the 2014 Aggregate Minerals Survey 2009 and 2014 Survey (Table 11), British Geological Survey.

3.6.4 The estimates of consumption of sand and gravel in West Berkshire are below the levels of sales in West Berkshire for the respective years (384,143 tonnes in 2009 & 157,205 tonnes in 2014), indicating that the local sales were able to satisfy the level of local demand (for sand and gravel) in these years, and that some was additionally available for exportation. However, the last year for which this data is available is 2014 and it is not known whether this situation is still the case.

3.6.5 In terms of soft sand, several methods to estimate consumption in West Berkshire have been provided in Appendix A. These estimates range from 4,719 – 32,177 tonnes per annum, and are below the LAA rate for soft sand of 43,730 tonnes. This indicates that using the current LAA rate will be sufficient to ensure adequate supplies are planned for in order to ensure local demand can be satisfied, and also make a contribution to the wider supply of this aggregate.

3.6.6 In terms of sharp sand and gravel, if the estimates of soft sand are removed from total estimates of sand and gravel consumption, this equates to between 74,200 and 101,658 tonnes per annum (based on the 2014 estimated consumption for total sand and gravel – Table 3.5). These levels are well within the LAA rate for sharp sand and gravel of 189,233 tonnes, which shows that providing for this rate will enable local demand to be satisfied and also ensure a contribution to wider supply.

3.7 Aggregate Producing Sites

3.7.1 Over the past decade, West Berkshire has seen a decline in the number of sites producing land won primary aggregates alongside the decline in sales. This is also reflected in a Berkshire-wide drop in the number of active sand and gravel sites. In 2001, there were 13 quarries in operation in West Berkshire producing primary aggregates and in 2019 this had dropped to two active[4] sites (with one worked out during the year).

[4] Active site is defined in this LAA as a site with planning permission for construction aggregate extraction where minerals have been worked during the year being reported upon.

3.7.2 Table 3.6 provides details of the operational sites in West Berkshire, and also sites with permission for mineral extraction, but where they either have not yet commenced, or reserves remain but were not worked in 2019 ('inactive' sites).

Table 3.6 - Active and Inactive Sand and Gravel Sites in West Berkshire (2019)

Site Name	Site Operator	Type of Aggregate	Site Notes	Comments
Active				
Harts Hill	Grundon	Hoggin – lower quality sand and gravel used as fill and generally sold as dug.	Materials are transport to the processing plant at Colthrop.	Small operation. Application to extend the period of working was approved in 2018. There is no tonnage limit on annual output, although there is a maximum number of HGV's (25 per day, limiting output to circa 140,000 tpa). Reserves of 100,000-tonnes remaining (31.12.19 – based on operator returns). Permission granted to extend extraction from 31st December 2020 to 30th June 2021.
Copyhold Farm	Raymond Brown	Soft Sand	In AONB. Granted consent on the basis that the majority of the mineral would supply the Marley tile factory, however it is unclear whether this remains the case.	Approved under RMLP policy 15. Commenced production in 2006. Extension approved under RMLP policy 15 to provide materials for Beenham. An additional extension of approximately 40,000 t was permitted in 2017. Conditions limit the production output to 60,000 tpa. No reserves remaining (31.12.19 – based on operator returns). **Site worked out in 2019.**
Inactive				
Craven Keep	Earthline	Sharp Sand & Gravel	-	Inactive, small remaining reserve of 55,000 tonnes, with two years remaining for extraction.
Moores Farm	Caversham Project Management Ltd.	Sharp Sand gravel	-	Active inert waste recycling facility, however inactive in terms of mineral extraction. Small remaining reserve of approximately 10,000-15,000 tonnes required to be extracted by 31st December 2023. No limit on production.
Lower Farm, Wasing[5]	Lafarge Tarmac & Marley	Sharp Sand & Gravel	-	Extraction of 2.4 mt of sharp sand and gravel at a rate of 200,000 tpa. The planning permission has been implemented but extraction has yet to commence.

Source: West Berkshire Council - Planning application information and annual Aggregates Monitoring Surveys.

[5] http://publicaccess.westberks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=M4U2FVRD0EA00

3.7.3 It is noted that the Replacement Minerals Local Plan for Berkshire (RMLP) sets out a number of preferred areas, designed to meet the needs of that plan. There remain two sites identified in the adopted RMLP located in West Berkshire estimated to contain circa 1,700,000 tonnes of sharp sand and gravel that have not yet been worked, or been the subject of planning applications. There is no certainty over whether these sites will ever be worked (and indeed having been allocated for over 15 years and no application having been forthcoming it seems unlikely). Therefore, the West Berkshire MWLP does not take these reserves into account, and is proposing to provide for the complete requirement identified over the plan period.

3.8 Aggregate Reserves

3.8.1 As Figure 3.2 shows, aggregate reserves in West Berkshire declined markedly from 2001, to an all-time low in 2012. However, the granting of planning permission for the extraction of 2.4 mt of sharp sand and gravel from Lower Farm at Wasing in 2013 has dramatically increased the amount of available reserves in West Berkshire (although this permission has now been implemented, extraction has yet to commence on this site).

3.8.2 Although permitted reserves at the end of 2019 totalled 2,567,500 tonnes, (all of these were sharp sand and gravel, with no reserves of soft sand), it has to be noted that the majority of these reserves are located in a single site that has been implemented but has yet to commence production.

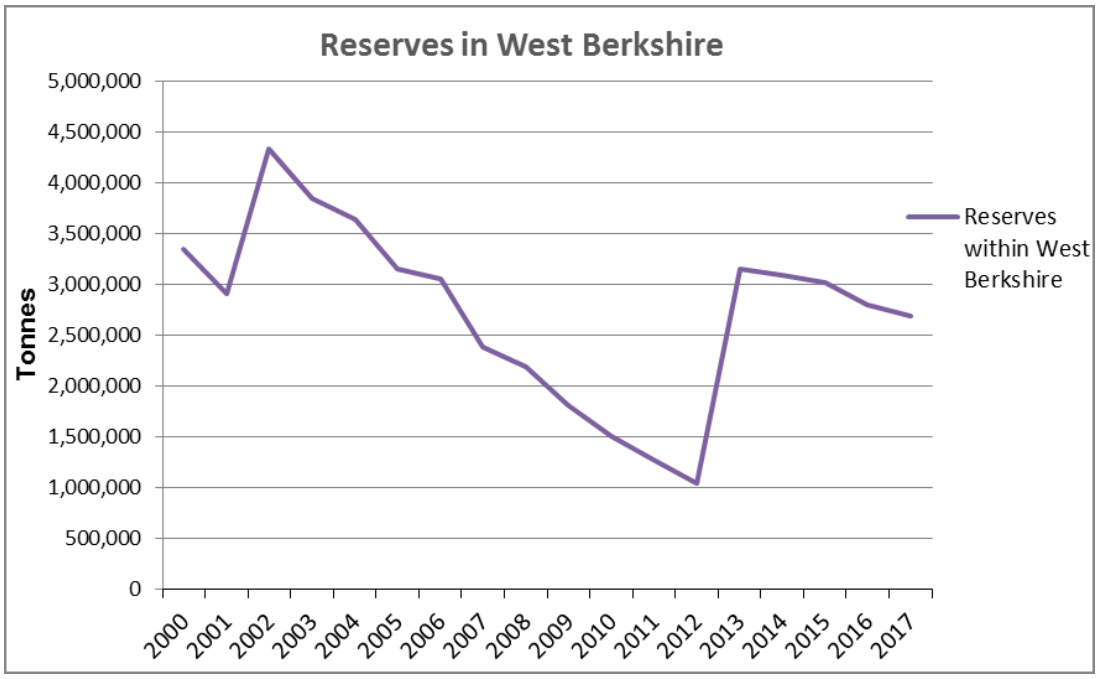

Figure 3.2 – Aggregate Reserves in West Berkshire. Source: West Berkshire Council - Annual Aggregates Monitoring Surveys.

3.9 Balance between Supply and Demand

Landbank

3.9.1 The balance between supply and demand can be shown in one way by the calculation of the 'landbank' of supply for aggregate minerals. The landbank is based on the amount of remaining reserves (supply) and required extraction rate (demand). The NPPF requires that a landbank of at least 7 years is maintained for sand and gravel (para 201).

3.9.2 The total permitted reserves at the end of 2019 stood at approximately 2,567,500 tonnes. Based on the 'LAA rate' (as set out in the 2020 LAA), the landbank for sharp sand and gravel at the end of 2019 was approximately 13.6 years, for soft sand was 0 years and for combined sand and gravel was 11 years (shown in Table 3.7). The landbank based on the recent 3 year average has also been included for comparison.

Table 3.7 - West Berkshire Landbank Calculations 2019 (years)

2019	Sharp Sand and Gravel	Soft Sand	Total Sand and Gravel
LAA Rate (tpa)	189,233	43,730	232,964
10 Year average	128,581	27,652	156,233
3 year average	52,684	13,459	66,143
Remaining Reserves	2,567,500	0	2,567,500
Landbank based on LAA Rate	13.6 years	0 years	11 years
Landbank based on 10 year average	20.0 years	0 years	16.4 years
Landbank based on 3 year average	48.7 years	0 years	92.8 years

3.9.3 Table 3.7 shows that the landbank, based on the LAA Rate is above the required 7 years for sharp sand and gravel and total sand and gravel. However, it is significantly below 7 years for soft sand. If the level of sales of construction aggregates in West Berkshire remains at the level seen in more recent years (3 year average), then the permitted reserves of sharp sand and gravel would last much longer, although the landbank for soft sand still remains far below the required 7 years, indicating that additional sources of this aggregate are required in order to maintain a 'steady and adequate supply' in line with NPPF paragraph 207.

Production Capacity

3.9.4 Production capacity is also a relevant factor in assessing the balance between supply and demand. If the ability to produce the LAA rate from sites within the district is not available, then it will not be able to achieve the 'steady' part of the 'steady and adequate supply' of aggregates as required by the NPPF. A list of sites and their estimated production capacities are listed in Table 3.8.

3.9.5 The 2019 level of annual production from operational sites (combined sand and gravel) in West Berkshire was estimated at 100,000 tonnes, which is far below the LAA requirement for combined sand and gravel of 232,964 tonnes per annum. However, inactive sites have the potential to contribute to a further 240,000 tonnes per annum, in which case this rate could be met. However, whether inactive sites are able to resume/start production to meet future demand is not certain, and unless other sites come forward through the planning process, the LAA rate may not be achieved in the near future.

Table 3.8 - Estimated Production Capacity in West Berkshire

Site Name	Type of Aggregate	Comments	Capacity (tonnes)
Active			

Harts Hill	Hoggin	There is no tonnage limit on annual output, although there is a maximum number of HGV's (25 per day, limiting output to circa 140,000 tpa). Reserves of circa 100,000 tonnes remaining (based on operator returns) to be worked by 30th June 2021.	100,000
Total Operational Capacity			**100,000**
Inactive			
Craven Keep	Sharp Sand & Gravel	Inactive, small remaining reserve of 55,000 tonnes, with two years permitted for extraction.	27,500
Moores Farm	Sharp Sand & Gravel	Active inert waste recycling facility, however inactive in terms of mineral extraction. Small remaining reserve of approximately 10,000-15,000 tonnes required to be extracted by 31st December 2023. No limit on production.	12,500
Lower Farm, Wasing[6]	Sharp Sand & Gravel	Extraction of 2.4 mt of sharp sand and gravel at a rate of 200,000 tpa. Extraction yet to commence.	200,000
Total Non-operational Capacity			**237,500**
Total Permitted Capacity			**317,500**

3.9.6 These figures show that current operational capacity in West Berkshire is limited by the amount of remaining available reserves at active sites and suggests that production capacity is a significant factor that could affect the balance of supply to the county. However, when taking into account currently permitted but inactive reserves (for sharp sand and gravel) the production capacity would be sufficient to meet the LAA Rate. Production of soft sand would still be constrained by remaining permitted reserves.

3.10 When New Primary Aggregate Producing Sites are Likely to be Required

3.10.1 To assist in determining when new sites may be required, an estimate has been made of the production levels from current permitted sites year on year, along with the estimated remaining reserves. In doing so, certain assumptions have had to be made about when sites are in production, in order to obtain a view on how reserves will deplete.

3.10.2 In carrying out this approach it is apparent that it will be challenging for West Berkshire to currently meet the chosen LAA rate (being the ten year average of historic sales). The results of this analysis are show in Tables 3.9 and 3.10.

Table 3.9 – Estimated Future Outputs and Reserves – Sharp Sand and Gravel

Year	Total Est. Reserves at Start of Year	Land-bank in Yrs	Total Estimated Production*	LAA Rate	Yearly Reserve Surplus/ Shortfall**	Yearly Production Surplus/ Shortfall
2019	2,627,500	13.88	42,833	189,233	1,242,869	-146,400

[6] http://publicaccess.westberks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=M4U2FVRD0EA00

2020	2,567,500	13.57	50,000***	189,233	1,192,869	-139,233
2021	2,517,500	13.30	90,000****	189,233	1,102,869	-99,233
2022	2,427,500	12.83	200,000*****	189,233	902,869	10,767
2023	2,227,500	11.77	200,000	189,233	702,869	10,767
2024	2,027,500	10.71	200,000	189,233	502,869	10,767
2025	1,827,500	9.66	200,000	189,233	302,869	10,767
2026	1,627,500	8.60	200,000	189,233	102,869	10,767
2027	1,427,500	7.54	200,000	189,233	-97,131	10,767
2028	1,227,500	6.49	200,000	189,233	-297,131	10,767
2029	1,027,500	5.43	200,000	189,233	-497,131	10,767
2030	827,500	4.37	200,000	189,233	-697,131	10,767
2031	627,500	3.32	200,000	189,233	-897,131	10,767
2032	427,500	2.26	200,000	189,233	-1,324,631	10,767
2033	227,500	1.20	200,000	189,233	-1,297,131	10,767
2034	27,500	0.15	27,500	189,233	-1,324,631	-161,733
2035	0	0	0	189,233	-1,324,631	-189,233
2036	0	0	0	189,233	-1,324,631	-189,233
2037	0	0	0	189,233	-1,324,631	-189,233

* Actual production figure for the 2019 year. Assumes that from 2021 all inactive sites also commence production except Lower Farm.
** Based on maintaining a 7 year landbank = 7 x 189,233 = 1,324,631
*** Comprised of 50,000 t Harts Hill.
**** Comprising 50,000 t Harts Hill to exhaustion, 12,500 t Moores Farm to exhaustion and 27,500 t Craven Hill to exhaustion.
***** Increase in production due to Lower Farm commencing production

Table 3.10 – Estimated Future Outputs and Reserves – Soft Sand

Year	Total Est. Reserves at Start of Year	Land-bank in Yrs	Total Estimated Production*	LAA Rate	Yearly Reserve Shortfall**	Yearly Production Shortfall
2019	15,000	0	16,530	43,730	-307,640	-27,200
2020	0	0	0	43,730	-306,110	-43,730
2021	0	0	0	43,730	-306,110	-43,730
2022	0	0	0	43,730	-306,110	-43,730
2023	0	0	0	43,730	-306,110	-43,730
2024	0	0	0	43,730	-306,110	-43,730
2025	0	0	0	43,730	-306,110	-43,730
2026	0	0	0	43,730	-306,110	-43,730
2027	0	0	0	43,730	-306,110	-43,730
2028	0	0	0	43,730	-306,110	-43,730
2029	0	0	0	43,730	-306,110	-43,730
2030	0	0	0	43,730	-306,110	-43,730
2031	0	0	0	43,730	-306,110	-43,730
2032	0	0	0	43,730	-306,110	-43,730
2033	0	0	0	43,730	-306,110	-43,730
2034	0	0	0	43,730	-306,110	-43,730
2035	0	0	0	43,730	-306,110	-43,730

2036	0	0	0	43,730	-306,110	-43,730
2037	0	0	0	43,730	-306,110	-43,730

* Actual production figure for the 2019 year.
** Based on maintaining a 7 year landbank.

3.10.3 These calculations indicate that the current level of permitted reserves of sharp sand and gravel (at the end of 2019/start of 2020) are projected to be sufficient to maintain a 7 year landbank until 2027, however after this date the landbank is likely to fall below the required 7 year level. For soft sand, the landbank is only 0 years at the current LAA rate. A further 306,110 tonnes of soft sand would be required to obtain the minimum landbank required.

3.10.4 Tables 3.9 and 3.10 also show that the existing permitted estimated site production levels are such that the level of production from the consented sites in West Berkshire would struggle to achieve the LAA rate using the 10 year average sales approach.

3.10.5 The future mineral reserve needed for the plan period to 2037[7] based on the LAA rate is outlined in Table 3.11.

Table 3.11 - Aggregate Mineral Requirement in West Berkshire to 2037

	Sharp Sand and Gravel	Soft Sand	Total
LAA Rate	189,233	43,730	232,964
Total Requirement (2020 – 2037 (18 years))	3,406,194	787,140	4,193,334
Permitted Reserves (estimated at start 2020)	2,567,500	0	2,567,500
Remaining Requirement	**838,694**	**787,140**	**1,625,834**

3.10.6 When the level of already permitted reserves is deducted from the requirement from 2020 to 2037 based on the LAA rate, there is a need for approximately an additional 1.63 million tonnes of sand and gravel over the plan period (840,000 tonnes of sharp sand and gravel and 790,000 tonnes of soft sand.)

3.10.7 In respect of land won primary aggregates, it is apparent that there is a need for additional supplies if West Berkshire is to maintain an ongoing steady and adequate supply of primary construction aggregates at the identified requirement rate.

3.11 Summary

3.11.1 Sales of both sharp sand and gravel and soft sand have been declining over the past decade. The past 10 year sales average (2010 – 2019) for sharp sand and gravel is 128,581 tonnes, and for soft sand is 27,652 tonnes. However, the 2020 LAA determined that due to the declining number of active sites and remaining reserves in these sites in recent years, the previous 2018 LAA rates should remain in place for 2020 (189,233 tpa for sharp sand and gravel and 43,730 tpa for soft sand).

[7] The plan period may alter over the course of the consultation upon and development of the West Berkshire Minerals and Waste Local Plan but for the purpose of this local aggregate assessment the plan period has been assumed to be to 2037.

3.11.2 Reserves for sharp sand and gravel at the end of 2019 were 2,567,500 tonnes, which equates to a landbank of 13.6 years based on the LAA Rate. There were no reserves for soft sand at the end of 2019 and therefore no landbank.

3.11.3 The number of primary aggregate producing sites has been declining in recent years, along with production capacity. Current operational capacity in West Berkshire is limited by the amount of remaining available reserves and is not currently sufficient to deliver either the LAA rate for sharp sand and gravel and soft sand.

3.11.4 The additional requirement for sand and gravel over the Plan period is approximately 1,630,000 tonnes, comprising 840,000 tonnes of sharp sand and 790,000 tonnes of soft sand.

3.11.5 Therefore it is apparent that additional supplies of these aggregates are required in order to maintain a steady and adequate supply of construction aggregates over the Plan period as required by the NPPF.

4.0 Recycled and Secondary Aggregates

4.1 Recycled and Secondary Aggregates in West Berkshire

4.1.1 Recycled aggregates are obtained from the processing of construction and demolition waste and secondary aggregates are aggregates derived as a by-product of other quarrying, mining or industrial operations.

4.1.2 Recycled aggregates have historically been used in low grade construction applications, such as fill, but it is understood that this situation is changing due to advances in the recycling industry. This matter will be kept under review, as advances in recycling techniques, such as aggregate washing facilities and advances in sorting, screening and blending operations can facilitate the production of a higher quality material, which may be able to replace more and more primary minerals. Such washing facilities have been permitted at sites in West Berkshire. In addition, construction techniques are also evolving to ensure that the minimum amount of primary material is utilised.

4.1.3 There are no known sources of notable secondary aggregates within West Berkshire, although in 2019, 22,290 tonnes of substandard blocks from Forterra Thermalite were used in the manufacture of concrete blocks. There are also a number of energy from waste facilities currently operational in relative proximity to West Berkshire, such as Ardley Energy from Waste plant in Oxfordshire and Colnbrook (Lakeside) Energy from Waste plant in Slough. These facilities produce Incinerator Bottom Ash (IBA) which can be recycled for use as aggregate.

4.1.4 The NPPF requires that so far as is practicable, account should be taken of the contribution that secondary and recycled materials can make to the supply of materials, before considering extraction of primary materials (paragraph 204). This means that the production of recycled aggregates in the district should be encouraged and the capacity to recycle aggregates should be maintained.

4.2 Production/Sales

4.2.1 The data sources for recycled aggregates for the south east are regarded as ‘less robust’ than the information collected for primary aggregates. The figures are collected yearly, as part of the aggregate monitoring survey carried out by each Mineral Planning Authority, but the response rate for these surveys is often lower than the response rate for primary aggregates, and does not include monitoring of aggregate generation from mobile plants. As such, the results should be treated with caution and should be relied upon as no more than a ‘reasonable indication’ of what is taking place.

4.2.2 The output/sales of recycled aggregates in 2019 totalled 344,645 tonnes, while 31,936 tonnes of material for non-aggregate uses (landfill engineering/restoration material, and soils) was also produced.

4.2.3 As can be seen from Figure 4.1, recycled aggregate sales in West Berkshire have been increasing over the last 10 years for which data is available. There was a larger increase between 2015 and 2016, which has not continued, but if this 2016 figure is taken as an anomaly, recycled aggregate sales have still continued to rise over the 10 year period. The average of sales for this period is 281,949 tonnes, an increase of approximately 62% from 2009. The past 3 year average is 328,637 tonnes, and reported sales in 2019 (344,645) were nearly double those of 2009.

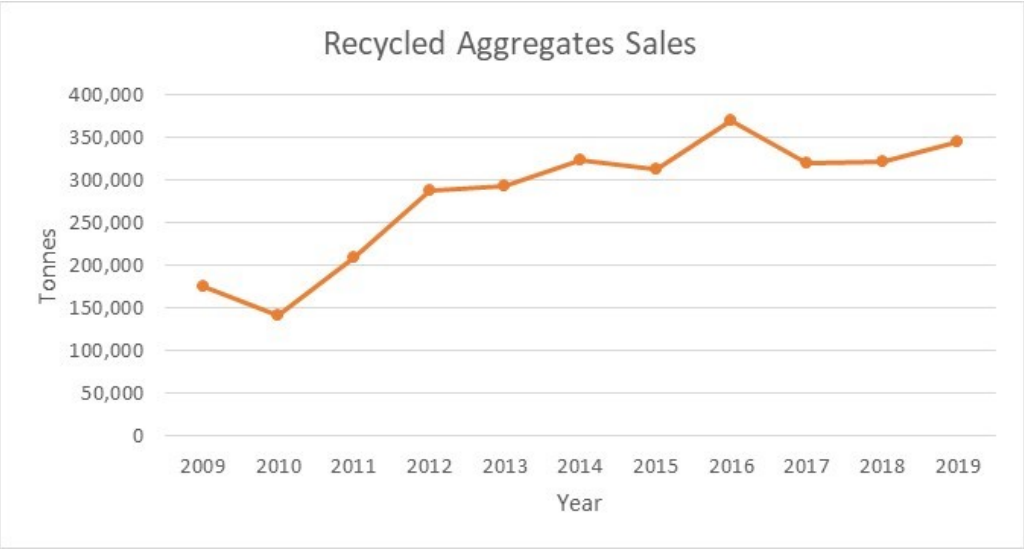

Figure 4.1 - Recycled Aggregate Sales in West Berkshire. Source: West Berkshire Council Aggregate Monitoring Survey Returns (2012 – 2019) and DEFRA methodology of 89% treated C&D waste (2008 – 2011).

4.2.4 Since 2012, the level of recycled aggregates sold in the district has exceeded the level of primary aggregate sales. Recycled aggregates can potentially reduce the need for primary aggregates in the future, although there are only limited uses for which these can substitute and therefore there will always be a requirement for some land-won aggregate within the district. This matter will be kept under review as advances in recycling techniques can facilitate the production of a higher quality material, which may be able to replace more and more primary minerals.

4.2.5 The demand for primary aggregates and recycled aggregates are reflected in their respective past 10 year sales averages. Where it is more economic, or practical to use recycled and secondary aggregates in preference to primary materials, the market will decide this. Therefore, if the demand for primary aggregates is decreasing, then this will be reflected by a declining 10 year average of sales. Similarly, if the demand for alternative aggregates is increasing proportionally, then this will be reflected in an increasing 10 year average of sales. These market changes over time would be reflected in the 10 year sales average approach, and therefore the 2020 LAA did not consider this significant enough to warrant an identified departure from this.

4.3 Consumption

4.3.1 Details of consumption of recycled and secondary aggregates is not readily available, as import/export data is not monitored in the same way as it is for primary aggregates. Nevertheless, an estimate can be generated by applying a national rate of utilisation of recycled aggregates, as a proportion of total aggregates used in the construction industry. Recycled and secondary aggregates are estimated to represent nearly 30% of the total market for aggregates in Great Britain[8] and in 2019 it was 29%[9].

[8] Long-term Aggregates Demand and Supply Scenarios, 2016 – 2030 (Mineral Products Association) http://www.mineralproducts.org/documents/MPA_Long_term_aggregates_demand_supply_scenariors_2016-30.pdf

[9] Sustainable Development Report 2019 (Mineral Products Association) https://mineralproducts.org/documents/MPA_SD_Report_2019.pdf

4.3.2 The national rate of utilisation percentages have been applied to the estimated total primary aggregate (sand and gravel and crushed rock) consumption figures for West Berkshire, to calculate an estimate of the amount of recycled aggregate consumed in West Berkshire. This has shown (Appendix B) that in 2018 (the most recent year for which data is available), an estimated 180,654 tonnes of recycled aggregate was consumed in West Berkshire. This figure will only be able to be updated once national data has been updated in the Annual Minerals Raised Inquiry Survey, as it relies on estimating West Berkshire total aggregate consumption as a percentage of England's consumption.

4.3.3 The estimated consumption figure for recycled aggregates of 180,654 tonnes is significantly lower than 2019 sales figures for recycled aggregates (344,645 tonnes), suggesting that the remainder is exported out of the district. Therefore in order to provide the recycled aggregate capacity required to continue recent levels of sales it is recommended to use an average of sales rather than estimates of consumption to determine future demand and encourage supply of these aggregates.

4.3.4 The last 10 year average of sales of recycled aggregates is 292,585 and the average for the last 3 years is 328,637 tonnes. Given the national priority to first seek to take account of the contribution recycled aggregates can make to the supply of materials before considering extraction of primary materials, (NPPF para 204) it would be prudent to use the higher of these figures (3 year average) in planning for the supply of recycled aggregates.

4.4 Construction and Demolition (C&D) Waste Arisings & Treatment

4.4.1 A predominant source of recycled aggregates includes waste arising from the construction and demolition sector - for example bricks, concrete, tiles, soil and stones. To be converted into recycled aggregate, this C&D waste is 'treated' in some way, i.e. washing, crushing and screening.

4.4.2 In March 2012, DEFRA published a new methodology[10] that can be used for estimating total construction and demolition waste generation, which was developed in partnership with other agencies and industry bodies and used only existing data sources. An attempt has been made to apply that methodology to West Berkshire using available data sources in the Local Waste Assessment 2020 (based on 2018 data). The methodology estimates that approximately 350,000 tonnes of CDE waste was produced in West Berkshire in this year (see Appendix C for methodology). The estimates of CDE waste since 2014 using this methodology have fluctuated between around 350,000 – 570,000 tonnes (Table 4.2), suggesting supply of raw materials to provide recycled aggregates is not constrained.

Table 4.2 – Estimates of CDE Waste Arising in West Berkshire based on modified 2012 DEFRA methodology

Year	CDE Estimate (tonnes)
2014	439,268
2015	500,096
2016	569,441
2017	458,619
2018	347,089

[10] Methodology for Estimating Annual Waste Generation from the Construction, Demolition and Excavation Sectors in England, March 2012, DEFRA https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/119680/CDE-generation-methodology.pdf

4.4.3 Due to the fact that there are no restrictions upon the movement of C&D waste across administrative boundaries and that excavation waste is less able to be recycled for use as aggregate, it is considered that the volume of construction and demolition waste sold as recycled aggregates in West Berkshire is considered a more representative figure to ensure that adequate capacity is planned for, rather than the amount of CDE waste arising in the district.

4.5 Recycled Aggregate Sites

4.5.1 At the end of 2019, West Berkshire had eight sites with planning permission to manage inert waste and produce recycled aggregates. Their planning status, sales, and theoretical operational capacities are shown in Table 4.3. Seven of the sites were operational in 2019. The location of recycled aggregate facilities in West Berkshire are shown on Figure 3.1.

4.5.2 Table 4.3 shows that the level of actual recycled aggregates production is significantly lower than the theoretical levels of production capacity. This is likely to be due to the fact that some of the sites do not deal exclusively with the production of recycled aggregates, and not all inert waste treated at such sites is suitable for recycled aggregate use. In addition, this data excludes any recycled aggregate production on development sites, through the use of mobile plant.

Table 4.3 - Recycled Aggregate Facilities in West Berkshire

Site Name	Recycled Aggregate produced (tonnes)	Recycled Aggregate Production Capacity (tpa)	Status at End of 2019[11]
Reading Quarry Recycling	195,292	275,000	Operational
Whitehouse Farm	87,265	150,000+	Operational
Theale Quarry WRTF	0	90,000	Operational
Colthrop, Avon site	35,000	93,000	Operational
Colthrop, Grundons	2,474	10,000	Operational
Moores Farm	24,613	35,000	Operational
Old Stocks Farm	0	16,250	Operational
Copyhold WTS *	0	75,000+	Non-operational
Total Operational Capacity		**669,250+**	
Total Permitted Capacity		**744,250+**	
Total Recycled Aggregates Produced in 2019	**344,645**		
Sources of capacity estimates: Data from WBC, WDI and Planning permissions Capacity estimate based primarily on WBC (operator returns), and permit information, or planning			

[11] For some sites this information was assumed as no return was received

permission information
Key:
* Temporary planning permission
+ Some figures will include skip waste, recycling and construction and demolition processing

4.6 Summary

4.6.1 The level of recycled aggregates estimated to have been produced, and also consumed, within West Berkshire is understood to have increased over the past decade.

4.6.2 The overall operational aggregate recycling capacity in West Berkshire in 2019, as indicated by industry surveys is estimated at 669,250 tonnes. A large proportion of this capacity remains available for future growth, as the majority of this capacity is from permanent operations.

4.6.3 The level of output of recycled aggregates in 2019 was approximately 344,645 tonnes, which is significantly above the estimated level of consumption of recycled aggregates in West Berkshire of 180,654 tonnes (see Appendix B). Therefore, it is estimated that the volume of recycled aggregates produced in West Berkshire is supporting a demand that extends beyond the authority area. The level of aggregate recycling capacity in West Berkshire is such that it is understood that construction and demolition waste is being imported into the authority, where it is processed to create recycled aggregates that are then used in West Berkshire, or exported. This has been confirmed through conversations with operators.

4.6.4 Given the national priority to first seek to take account of the contribution recycled aggregates can make to the supply of materials before considering extraction of primary materials, (NPPF para 204) it is considered prudent to use the highest sales figure (three year sales average) for recycled aggregates of 328,637 tonnes in planning for the supply of recycled aggregates.

4.6.3 The current level of C&D recycling capacity is 669,250 tonnes per annum, therefore there does not appear to be an issue with the balance of supply to deliver the demand for recycled aggregates in West Berkshire. However, it will be important to safeguard existing recycled aggregate facilities in order to ensure that the security of supply is maintained and available to increase in future.

5.0 Rail Imported Crushed Rock and Marine Aggregates

5.1 Aggregate Rail Depots in West Berkshire

5.1.1 All counties in the UK have to import aggregates from elsewhere, as the available geology within each county means that no single minerals planning authority area produces the exact profile of types of aggregate, in the exact quantities necessary. The geological composition in West Berkshire means that the area needs to import supplies of crushed rock, as there are no sources of crushed rock in the authority area.

5.1.2 Crushed rock is imported into the district through the rail depots located at Theale. Small volumes of marine dredged sand and gravel are also known to be imported into West Berkshire through the district's rail depots. It is understood that some of these imports are used directly at the depots in concrete and asphalt manufacturing and some are subsequently exported by road.

5.1.3 The demand for hard rock and marine aggregate imports is likely to be driven, to some degree, by major mineral utilising businesses located at the rail depots, in West Berkshire, demanding such aggregates to be imported into the area to meet their specific market need for the end product i.e. asphalt and concrete. These specific market forces are likely to result in an inflated mineral 'need' within West Berkshire above that needed for the level of consumption for the area i.e. for house building, general construction etc. However, for the purposes of continuing the current supply arrangements (i.e. rail depots supporting a higher demand than West Berkshire only), total sales (rather than West Berkshire consumption) are considered to be the most appropriate in determining future need.

5.2 Sales/Imports

5.2.1 As explained previously, West Berkshire does not produce any crushed rock indigenously, nor are there any marine landing sites. As such the only 'sales' figures for these aggregates are recorded at the rail depots within the district. Therefore, these figures are also import figures.

5.2.2 Actual returns for the sales at these depots have historically been confidential due to them being commercially sensitive when there were only two rail depots operating within the District. As such, sales were estimated as a proportion of Berkshire-wide sales[12]. However, in 2016 there were effectively four aggregates depot 'sites' operating within West Berkshire, and therefore, West Berkshire specific figures for crushed rock can be obtained from this year onwards. However, sales of rail imported marine sand are still confidential due to the fact that not all depots were importing this aggregate.

5.2.3 In 2019, 783,075[13] tonnes of crushed rock was sold at the district's depots, a reduction from 901,198 tonnes in 2018. Sales of crushed rock and marine sand and gravel since 2009 are shown on Figure 5.1. This shows that sales of both

[12] Two out of the three rail depots operating in the former county of Berkshire were located in West Berkshire. Making the assumption that, prior to 2016, approximately two thirds of the mineral imported by rail into the former county of Berkshire is imported for onward sale into West Berkshire, this equates to approximately 287,000 tonnes of crushed rock sold in West Berkshire in 2009, and 774,000 in 2014. In 2011, separate monitoring obtained a Berkshire-wide figure for sales from aggregate rail depots within the county, again allowing an estimate of the amounts sold within West Berkshire. This was 504,000 tonnes for crushed rock.
[13] This is an estimated value as a return from a significant operator is outstanding.

aggregates have been increasing over this period. The 10 year sales average for crushed rock in 2019 was 629,885 tonnes, with a 3 year average of 840,266 tonnes.

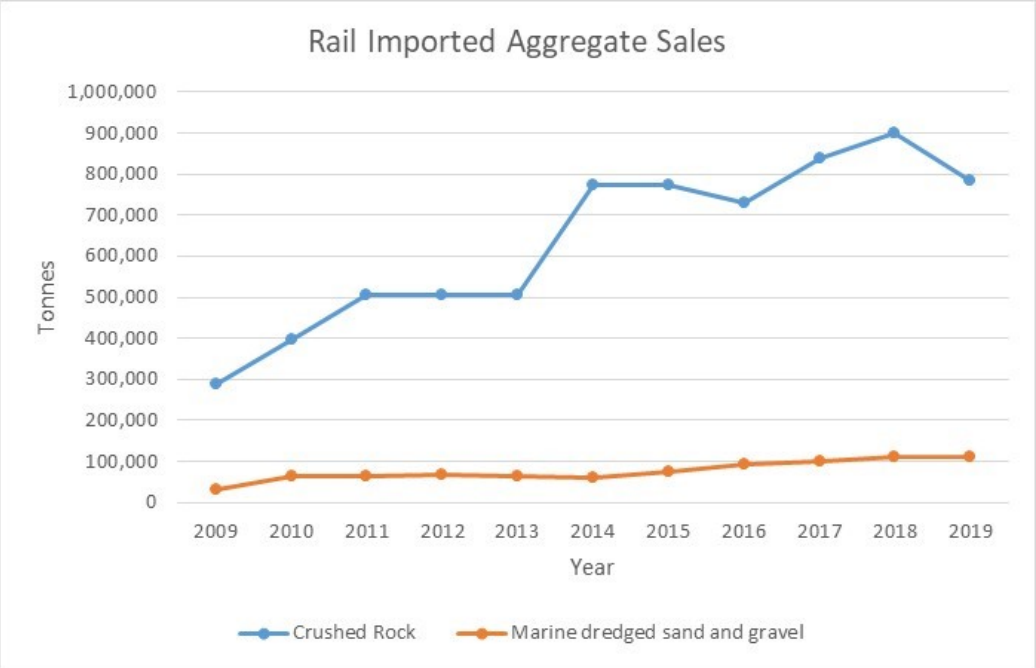

Figure 5.1 - Sales of Rail Imported Crushed Rock and Marine Aggregate at Rail Depots in West Berkshire. Source: Collation of the Results of the 2014 Aggregate Minerals Survey (2009 & 2014), BGS, West Berkshire Council.

5.2.4 In July 2016, BGS supplied data for the consumption of primary construction aggregates in 2014 by sub-region, identifying the source MPAs which the aggregates came from (Table 5.2).

Table 5.2 - Sources of Crushed Rock Imported into Berkshire 2014

Source MPA	Percentage	Tonnes
Somerset County Council	70-80%	812,700 – 928,800
North Somerset Council, South Gloucestershire Council, Leicestershire County Council, Shropshire Council, Powys, Rhondda, Cynon, Taf (Taff), outside England and Wales.	1-10%	11,610 – 116,100
Cornwall Council, Devon County Council, Gloucestershire County Council, Oxfordshire County Council, Cambridgeshire County Council, Yorkshire Dales National Park, Neath Port Talbot.	<1%	<11,610
Total		1,161,000

Source: AM 2014 Source of primary aggregates by sub-region - percentage categories (2016), BGS.

5.2.4 Table 5.2 shows that Somerset is the predominant source of crushed rock for Berkshire (70-80%), with smaller amounts coming from other sources around the UK. The most recent Somerset LAA (fourth edition, incorporating data from 2006 – 2015[14]) states that there are approximately 380 million tonnes of permitted reserves

[14] http://www.somerset.gov.uk/policies-and-plans/plans/somerset-minerals-plan/minerals-plan/?entryid100=59555&p=10

for crushed rock and a landbank of at least 28.4 years at the end of 2015. The LAA acknowledges that Berkshire is among the counties importing the largest amount of crushed rock from Somerset due to limited indigenous supply and high development demand, together with the available rail connections. The rail capacity in Somerset is indicated to be sufficient and with capacity to increase the amount moved by rail subject to demand. In addition, production capacity from crushed rock quarries within Somerset stands at over 21.8 million tonnes. Thus there does not appear to be any supply issues with continuing to source crushed rock from Somerset. Safeguarding existing capacity within West Berkshire for the importation of crushed rock will be important to ensure these flows are able to continue in future. Leicestershire and South Gloucestershire Councils have also confirmed that there are no planning reasons why similar movements could not continue in future.

5.2.5 The sources of marine sand and gravel imported into Berkshire in 2014 and approximate proportions of total imports are outlined in Table 5.3. Most comes from landings at wharves in London.

Table 5.3 – Sources of Marine Sand and Gravel Imported into Berkshire 2014

Source MPA	Percentage	Tonnes
Greater London – East	60-70%	91,200 – 106,400
Hampshire	20-30%	30,400 – 45,600
Medway	10-20%	15,200 – 30,400
Kent	1-10%	1,520 – 15,200
West Sussex	<1%	<1,520
Total		152,000

Source: AM 2014 Source of primary aggregates by sub-region - percentage categories (2016), BGS.

5.2.6 The London Aggregate Assessment (2016)[15] indicates (p.8) that the three marine regions supplying London and the South East would be able to maintain supplies to London and South East Market for 24.7 years at current extraction rates. Therefore there does not appear to be a supply issue with imported marine aggregates. However, the London LAA does highlight that the safeguarding of wharves and railheads will potentially be an issue with increased pressure from development. If these infrastructure assets are lost, capacity to transport these aggregates could be restricted.

5.3 Consumption

5.3.1 Historic movements of rail-imported aggregates into the former county of Berkshire have been captured approximately every four years as part of the aggregates monitoring survey undertaken by the Ministry of Housing, Communities and Local Government and published by the British Geological Survey. The amount of crushed rock and marine sand and gravel imported is also the same as the amount consumed, as neither of these aggregates are produced indigenously. The most recent data from AM 2009 and AM 2014 is outlined in Table 5.4. This table (and this section generally) will be updated and included in an addendum to this LAA when the AM2019 results are available (anticipated spring 2021).

5.3.2 It is possible to estimate consumption of rail imported aggregates in West Berkshire based on its proportion of the Berkshire-wide population in 2009 (18.0%) and 2014 (17.7%). This is shown in Table 5.4, which also shows that consumption of both marine sand and gravel and crushed rock has increased from 2009 – 2014.

[15] https://www.london.gov.uk/sites/default/files/london_laa_2016.pdf

Table 5.4 Rail Imported Aggregate Consumption in Berkshire and estimated West Berkshire Consumption 2009 & 2014.

	2009	2014
	Marine Sand and Gravel (tonnes)	
Berkshire Consumption	98,000	152,000
Est. West Berkshire Consumption	17,640	27,360
	Crushed Rock (tonnes)	
Berkshire Consumption	861,000	1,161,000
Est. West Berkshire Consumption	152,397	205,497

Source: Collation of the Results of the 2014 Aggregate Minerals Survey (2009 & 2014), BGS. Table 10.

5.4 Rail Depot Capacity

5.4.1 From 2016, there were effectively four aggregates depot 'sites', as the depot importing crushed rock for asphalt is now utilised by two different operators, with separate sales figures. In addition, one depot that previously imported cement has begun to import raw aggregates for the manufacture of concrete and for onward transportation. As such, this site is also included in sales figures for imported aggregates.

5.4.2 Operator returns for suggest that the capacity at West Berkshire's rail depots was in the region of 1,026,500[16] tonnes (although it is likely to be in excess of this as one of the site capacities is estimated based on the sales figure provided, and one operator recorded sales of 50,000 tonnes above the stated capacity).

5.4.3 When considered against the proposed LAA rates for rail imported crushed rock and marine sand and gravel (840,266 and 116,574 tonnes respectively (equivalent to the 3 year average sales)), the available rail depot capacity (1,026,500 tonnes) suggests that this infrastructure is sufficient to maintain these rates (956,840 tonnes total), and also accommodate some growth in future. When considered against 2019 sales (893,287 tonnes of crushed rock and marine sand and gravel), the depots appear to be operating just under capacity (although there is some uncertainty over this capacity as one operator has stated that their capacity is 'unknown' so capacity at this site has been estimated based on sales and another operator has recorded sales at 50,000 tonnes above the stated capacity, indicating a greater capacity than estimated). Nevertheless, it will be essential to safeguard this infrastructure in future to ensure current levels of sales are able to be maintained in order to satisfy demand.

5.4.4 The railhead sites in West Berkshire all have existing markets which they are serving, and there is no reason to suggest that these sites will not continue to supply these same markets for the foreseeable future. Therefore, it is considered that there is currently sufficient capacity for the importation of material by rail.

5.5 Summary

5.5.1 West Berkshire imports crushed rock and marine sand and gravel into the rail depots at Theale. This is due to there being no indigenous sources of crushed rock or marine landing wharves in the district. Sales and consumption of both aggregates have been increasing in recent years.

5.5.2 Crushed rock is mainly imported from Somerset, and no supply issues have been identified with this arrangement. Marine sand and gravel is mainly imported by rail

[16] Value taken from 2019 LAA as surveyed capacity data was not available at the time of drafting.

from wharves in London and although no supply issues have been identified with this arrangement, the safeguarding of wharves and railheads in London will be critical to ensuring the capacity to export these materials is maintained.

5.5.3 The capacity at West Berkshire's rail depots in 2019 was in the region of 1,026,500 tonnes which indicates that the depots appear to be operating below capacity when considered against 2019 sales. It will be essential to safeguard this infrastructure in future to ensure levels of sales are able to be maintained in order to satisfy demand.

6.0 Overview of Aggregate Sales

6.1 The sales of land-won sand and gravel, recycled and secondary aggregates and rail imported crushed rock and marine sand and gravel are shown in Figure 6.1, which shows the changes in the overall aggregate mix seen in West Berkshire in recent years.

6.2 There has been a steady decline in sales of land won sand and gravel extracted from within West Berkshire alongside a general increase in recycled aggregate production, and the relatively static level of marine imported aggregates. Since 2012 the level of recycled aggregates produced in West Berkshire has exceeded the level of primary aggregate sales, suggesting that the shortfall in the supply of primary aggregates could be being replaced by the production and sale of recycled aggregates though this is uncertain. However, as previously mentioned, recycled aggregates are not able to substitute for all aggregate uses. There is also a possibility that further marine aggregate and crushed rock may be able to be imported into West Berkshire to supplement the need for indigenous resources. This obviously has its own environmental impacts and sustainability issues.

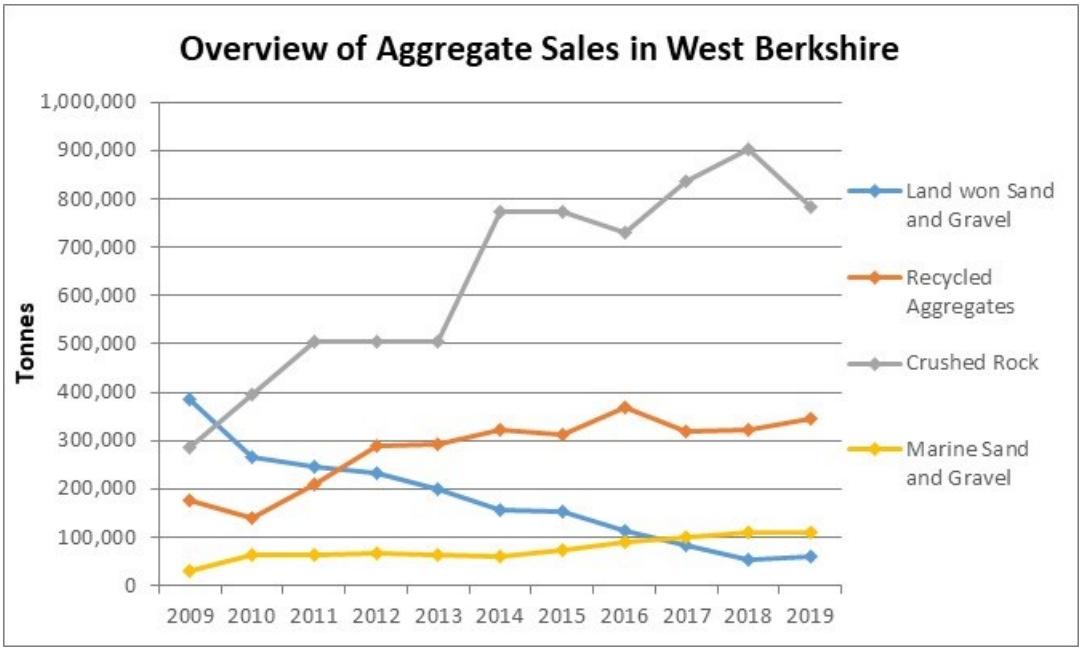

Figure 6.1 – Overview of Aggregate Sales in West Berkshire 2008 - 2019. Sources: West Berkshire Council Aggregates Monitoring Survey, Collation of the Results of the 2014 Aggregate Minerals Survey (2009 & 2014), BGS and South East England Aggregate Working Party Monitoring Report (2016), SEEAWP.

6.3 Figure 6.2 shows how the composition of aggregates sold within West Berkshire has changed in recent years. It can be seen that the sale of rail imported crushed rock, marine sand and gravel and sales of recycled aggregates have all increased proportionally since 2009. At the same time, sales of land won aggregates (sand and gravel) have been decreasing proportionally (from 44% in 2009 to 5% in 2019).

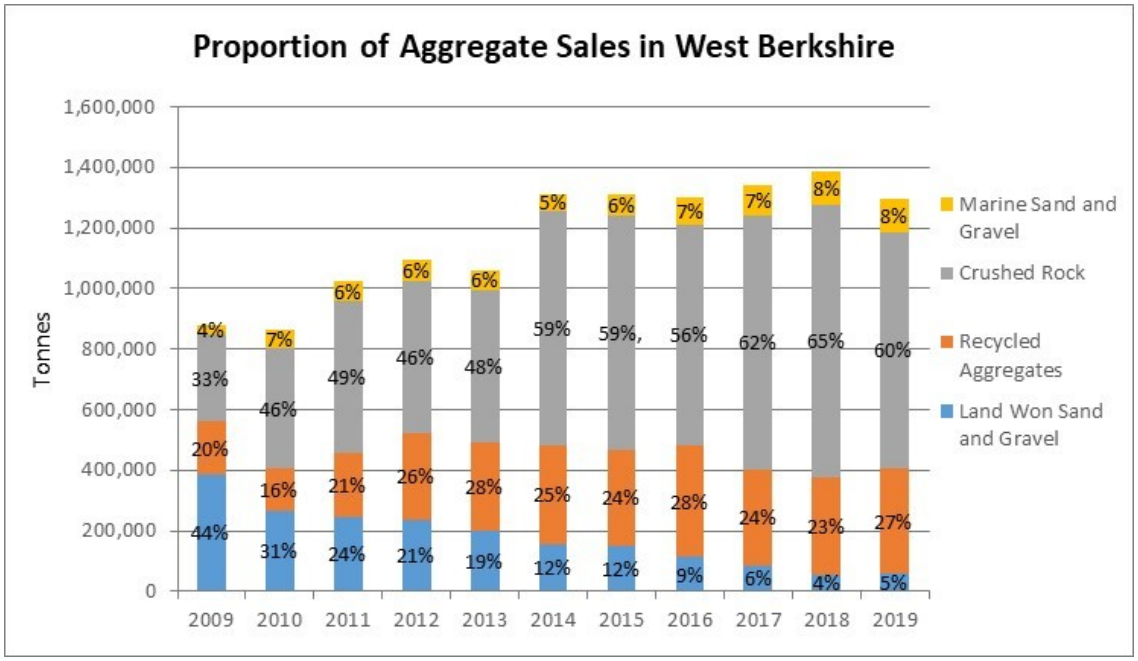

Figure 6.2 – Proportion of Aggregate Sales in West Berkshire.
Sources: West Berkshire Council Aggregates Monitoring Survey returns, Collation of the Results of the 2014 Aggregate Minerals Survey (2009 & 2014), BGS and South East England Aggregate Working Party.

7.0 Energy Minerals

7.1 Background

7.1.1 Energy minerals are broadly defined as those minerals that are used to produce electricity, fuels and heating. Hydrocarbons, comprising petroleum (oil and natural gas liquids) and gas, are fossil fuels which naturally occur in concentrations trapped in structures and reservoir rocks beneath the earth's surface[17] . The UK is very dependent on oil and gas, the gas primarily being used to generate electricity, and the oil being used mainly to derive fuels for transportation purposes on land, at sea, and in the air. Oil and gas are also used to heat homes, in industrial processes, and (in the case of oil) in the manufacture of nearly all synthetic items.

7.1.2 Conventional onshore oil and gas are found at depths generally between 800m and 1200m in porous and permeable reservoir rocks. The main method of establishing whether conventional oil and gas deposits are present is through reflection seismic surveying, enabling the subsurface geology to be mapped. Exploratory drilling would then be undertaken before the resource being extracted if it was found to be economically viable.

7.1.3 Coal is a hydrocarbon based fossil fuel which consists of a combustible sedimentary rock made of lithified plant remains[18]. Up until the 1970s coal was the primary fuel used in the generation of electricity in the UK. The overall consumption of coal for electricity generation rose after this decade, however overall consumption fell. Throughout the 1990s the use of coal in electricity generation was replaced by gas and to a lesser extent, nuclear energy. There continues to be a relatively small demand for coal for domestic and industrial purposes, as there does for the manufacture of smokeless fuel, and for direct injection into blast furnaces.

7.1.4 Coal can be mined by both underground and surface methods. There are two primary underground methods: 'longwall' mining where, as the mining proceeds the mined out areas are allowed to undergo controlled collapse; and 'pillar and stall' mining where pillars of coal are left in-situ in order to support the excavation. The 'longwall' method is more common in the UK, with the 'pillar and stall' method only being used at shallow depths for some small underground mines. Surface extraction of coal is essentially quarrying and is generally viable where one or more seams are 100m or less below the ground level.

7.1.5 Alternative fossil fuels, also referred to as 'unconventional' hydrocarbons are generally obtained from three different sources and involve extraction technologies which are very different from those used in the extraction of 'conventional' hydrocarbons[19]. The three different sources are:

- Methane from active coal mines (coal mine methane, CMM), and from abandoned coal mines (abandoned mine methane, AMM); and methane from undisturbed or virgin coal seams (coalbed methane, CBM).
- Shale gas and shale oils from mudrocks and shales.
- Combustion of underground coal seams in situ in order to produce synthetic gas (syngas) – commonly known as 'underground coal gasification (UCG).

[17] BGS, 2011, Mineral Planning Factsheet – Onshore Oil and Gas
[18] BGS, 2011, Mineral Planning Factsheet – Coal
[19] BGS, 2011, Mineral Planning Factsheet – Alternative fossil fuels

7.1.6 Various methods can be used to extract methane associated with coal seams, the suitability of which will depend on whether the methane is associated with coal mining activities or with virgin coal seams. CMM would primarily be removed as part of ventilation in a mining operation for safety reasons, and this gas would generally then be used to meet energy requirements on site. After a mine has ceased operation, methane will often continue to be released and collect in voids underground. Energy is recovered from this gas through the use of small electric generators.

7.1.7 Exploration for CBM can involve seismic reflection surveys, and exploratory drilling in order to establish if the CBM would be viable for extraction. If found to be viable, it is likely that hydraulic fracturing (fracking) would be undertaken whereby water, sand, and some chemicals are injected into the borehole, resulting in the release of CBM and the 'flowback' of water up through the borehole.

7.1.8 Shales and mudrocks are sedimentary rocks made up of clay sized particles. The nature of the flat particles is such that there is likely to be very little vertical permeability and therefore horizontal hydraulic fracturing would be necessary in order to release the gas trapped in the rocks. In a similar manner to the extraction of CBM, water, sand and chemicals would be injected horizontally through the boreholes into the shales/mudrock. The pressure created is designed to crack the shale, and the injected sand keeps the fissures open in order that the gas can flow back up the borehole to ground level. Following fracturing more water, sand, and chemicals can be injected into the borehole to keep the fractures open and aid the flow of gas.

7.1.9 Shale and mudrock deposits can contain shale oil as well as shale gas. Shale oil deposits can be worked at the surface, in a similar way to surface mining of coal deposits or exploited in situ. The in situ processing of shale oil has only been demonstrated on a relatively small scale through the heating of the shale oil and the extraction of the resulting gas and liquids.

7.1.10 The gasification of underground coal deposits is a process that involves the conversion of the coal into a gas product underground. Wells are drilled to ignite and fuel the underground gasification process. Separate production wells are also drilled to facilitate the recovery of the resultant gas at the surface.

7.2 Energy Minerals in West Berkshire

7.2.1 Conventional oil and gas have never been extracted on a commercial basis in West Berkshire. It is understood that this is primarily due to the underlying geology. The setting of West Berkshire over the London-Brabant Massif, to the north of the main Weald Basin, with shallow basement and only a thin Mesozoic cover lacking both source and reservoir rocks and deep burial means that the prospective for conventional oil and gas extraction is poor[20]. It is understood that exploratory conventional hydrocarbon boreholes have been drilled near to Stratfield Mortimer (in the south eastern corner of West Berkshire) in the mid-1960s, as well as in locations just across the border in Northern Hampshire, south of Newbury but such explorations have not developed into the exploitation of any resources.

[20] BGS, 2003, Mineral Resource Information in Support of National, Regional and Local Planning: Berkshire (comprising West Berkshire, Reading, Wokingham, Windsor and Maidenhead, Bracknell Forest and Slough)

7.2.2 There are understood to be deposits of deep coal underlying large areas of West Berkshire. However, these deposits are understood to be thin and are not currently worked and are considered likely to be too deep to be viable.

7.2.3 Similarly, unconventional sources of oil and gas have never been extracted on a commercial basis in West Berkshire. Again it is understood that this is primarily due to the underlying geology.

7.2.4 The British Geological Survey (BGS) in association with the Department of Energy and Climate Change (DECC) has completed an estimate for the amount of shale oil and shale gas in the Weald Basin in south-east England; published 23 May 2014[21].

7.2.5 The study area covers 10,825 km^2 of southern Britain and extends from Salisbury (Wiltshire) in the west to Ashford (Kent) in the east, shown in Figure 7.1. Southampton marks the south-western boundary. In geological terms this area corresponds to the area of the Weald Basin and the adjacent Pewsey Basin. The mapped area extends southwards to the south coast for completeness. Only a very small part of the West Berkshire unitary area is included within the study area, specifically an area in the south western corner of the district to the south of the village of Combe.

Figure 7.1 - Weald Basin Shale Oil and Shale Gas Study Area[22]

7.2.6 The study estimates that the volume of shale oil in the study area ranges between 2.20 and 8.57 billion barrels (bbl) or 293 and 1143 million tonnes, but the central estimate for the resource is 4.4 bbl or 591 million tonnes.

7.2.7 Using the current geological model no significant gas resource was recognised through this assessment, largely because the shales in the study area are not thought to have reached the geological maturity required to generate gas.

7.2.8 The figure for oil represents the total amount of oil estimated to be present in the rocks. It is not known what percentage of the oil present in the shale would be commercially viable. Drilling and testing of new wells would be required to estimate

[21] https://www.gov.uk/government/publications/bgs-weald-basin-jurassic-shale-reports
[22] BGS, 2014, The Jurassic Shales of the Weald Basin: Geology and Shale Oil and Shale Gas Resource Estimation

the shale oil reserve and to give a better idea of oil production rates. Non-geological factors such as oil price, operating costs and the scale of development agreed by the local planning system would also affect the amount of oil produced.

7.2.9 As can be seen in Figure 7.2 the BGS have identified the areas considered prospective for oil in the Jurassic shale units in relation to the urban areas of south east England. These areas do not extend into West Berkshire and on this basis it appears unlikely that there would be shale oil extraction from within or underneath West Berkshire, although it could not be entirely ruled out.

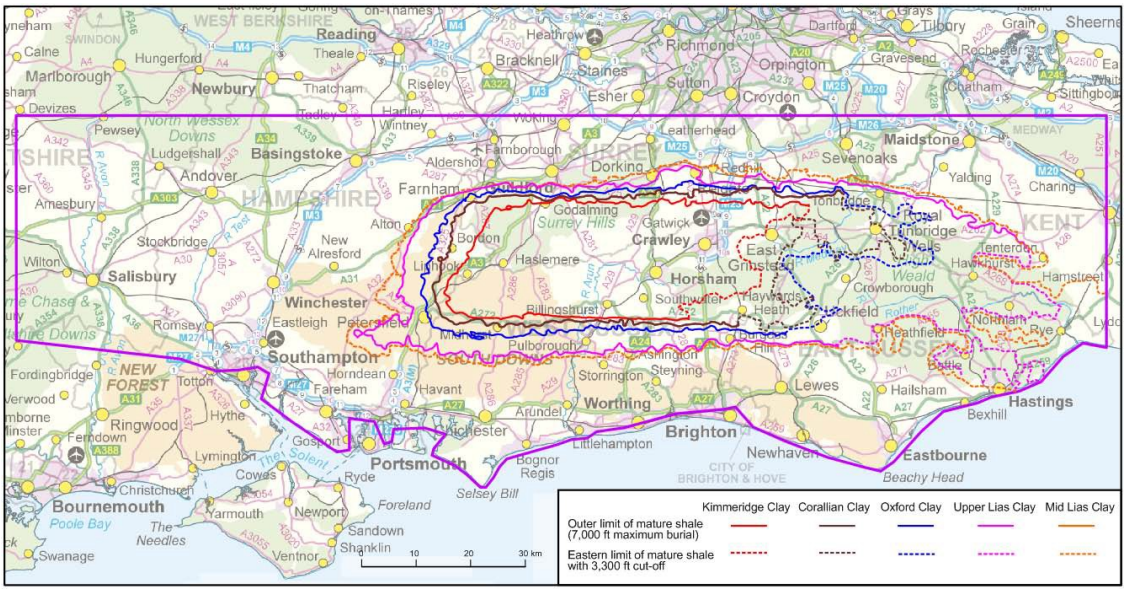

Figure 7.2 - Prospective areas for oil in the Jurassic shale units[23]

7.2.10 There are no active or abandoned coal mines in West Berkshire so there is obviously no potential for extraction of coal mine methane (CMM), or abandoned mine methane (AMM). With regard to coalbed methane (CBM) extraction it is understood that the gas seam contents within the coal deposits understood to be located beneath West Berkshire are such that the Coal Measures are classed as unproductive.

7.2.11 The BGS identify that the area to the north of Newbury within the Oxfordshire-Berkshire coalfield is known to have poor potential for UCG[24], however aside from this the potential for UCG in West Berkshire is unknown.

7.2.12 Exploration and production of oil and gas can only be undertaken in areas that are licensed by the Oil and Gas Authority. These are issued in a series of 'rounds', with the most recent being the 31st Offshore Licensing Round. The most recent onshore Licensing Round was in December 2015, and there is no indication when another round will take place. There are no current licenses in West Berkshire.

7.3 Planning Policy Context

7.3.1 The NPPF sets out national planning policy for England. With regard to the extraction of hydrocarbons the most relevant parts of the NPPF are set out below.

[23] BGS, 2014, The Jurassic Shales of the Weald Basin: Geology and Shale Oil and Shale Gas Resource Estimation
[24] BGS, 2004, UK Coal Resource for New Exploitation Technologies Final Report

7.3.2 Para 203 states that: *It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation.* In addition, Para 204 states that: *Planning policies should* [inter alia] *provide for the extraction of mineral resources of local and national importance.*

7.3.3 Para 205 states that *when determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy. In considering proposals for mineral extraction, minerals planning authorities should:* [inter alia]

- *ensure, that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality;*
- *ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties;*
- *provide for restoration and aftercare at the earliest opportunity, to be carried out to high environmental standards, through the application of appropriate conditions, where necessary. Bonds or other financial guarantees to underpin planning conditions should only be sought in exceptional circumstances;*

7.3.4 Para 209 of the NPPF confirms that Minerals planning authorities should also:

- *when planning for on-shore oil and gas development, clearly distinguish between, and plan positively for, the three phases of development (exploration, appraisal and production), whilst ensuring appropriate monitoring and site restoration is provided for;*
- *encourage underground gas and carbon storage and associated infrastructure if local geological circumstances indicate its feasibility;*
- *indicate any areas where coal extraction and the disposal of colliery spoil may be acceptable;*
- *encourage capture and use of methane from coal mines in active and abandoned coalfield areas; and*
- *provide for coal producers to extract separately, and if necessary stockpile, fireclay so that it remains available for use.*

7.3.5 Although not directly related to the extraction of hydrocarbons, para 210 states that: *when determining planning applications, minerals planning authorities should ensure that the integrity and safety of underground storage facilities are appropriate, taking into account the maintenance of gas pressure, prevention of leakage of gas and the avoidance of pollution.*

7.3.6 NPPF para 211 states that *permission should not be granted for the extraction of coal unless:*

- *the proposal is environmentally acceptable, or can be made so by planning conditions or obligations; or*
- *if it is not environmentally acceptable, then it provides national, local or community benefits which clearly outweigh the likely impacts (taking all relevant matters into account, including any residual environmental impacts).*

7.3.7 The Planning Practice Guidance (PPG) contains quite a substantial section on ‘Planning for Hydrocarbon extraction’. One of the sections (Paragraph 105; Reference ID 27-105-20140306) most relevant to plan-making states:

Mineral planning authorities are encouraged to make appropriate provision for hydrocarbons in local minerals plans through:

- *use of published data on information on the location of conventional and unconventional hydrocarbons, for example, that on the Department of Energy and Climate Change's "Oil and Gas: onshore exploration and production" pages of their website;*
- *use of ordnance survey based policies maps; and*
- *available data on existing wells (also available on the Department of Energy and Climate Change's "Oil and Gas: onshore exploration and production" web pages).*

This approach will allow mineral planning authorities to highlight areas where proposals for hydrocarbon extraction may come forward, as well as managing potentially conflicting objectives for use of land.

7.3.8 The PPG (Paragraph 104; Reference ID: 27-104-20140306) also confirms that the exploratory, appraisal or production phase of hydrocarbon extraction can only take place in areas where the Department of Energy and Climate Change has issued a license under the Petroleum Act 1998 (Petroleum License). At present no such licenses have been issued for the geographical area to be covered by the MWLP.

7.3.9 In regard to whether specific sites should be allocated for the working of energy minerals it may be that if and when any licenses are granted in the authority area, particular sites may have to be allocated as paragraph 107 of the PPG (Reference ID: 27-107-20140306) confirms that *"where appropriate…mineral planning authorities may include specific locations should the onshore oil and gas industry wish to promote specific sites."*

7.3.10 Paragraph 223 of the PPG (Reference ID: 27-223-20140728) confirms that when considering applications for unconventional hydrocarbon development in National Parks, the Broads and Areas of Outstanding Natural Beauty, mineral planning authorities should give great weight to conserving their landscape and scenic beauty. These areas have the highest status of protection in relation to landscape and scenic beauty, and the conservation of wildlife and cultural heritage in these areas should be given great weight. Where applications represent major development, planning permission should be refused in National Parks, the Broads and Areas of Outstanding Natural Beauty except in exceptional circumstances and where it can be demonstrated they are in the public interest. The assessment that needs to be carried out, including any detrimental effect on the environment, such as the noise and traffic which may be associated with hydraulic fracturing, is set out in paragraph 172 of the National Planning Policy Framework. Therefore, the presence of the North Wessex Downs AONB will be a key factor to be accounted for in this process.

7.3.11 In regard to how the environmental impacts of surface coal mining proposals should be assessed, para 147 (ref ID 27-147-20140306) states that they *should be considered in the same way as for other minerals. However, both coal operators and mineral planning authorities must have regard to the environmental duty placed on them under section 53 of the Coal Industry Act 1994 when preparing and determining planning application*s.

7.3.12 Para 148 (ref ID 27-148-20140306) states that *underground coal mining can raise additional issues to surface coal mining which mineral planning authorities may need to consider. These include: the potential effects of subsidence, including the potential hazard of old mine workings; the treatment and pumping of underground water;*

monitoring and preventative measures for potential gas emissions; and the method of disposal of colliery spoil.

7.4 Environmental Issues Arising from Hydrocarbon Extraction

7.4.1 The extraction of oil and gas by conventional methods would have noise, light and traffic impacts that would be similar to 'heavy industrial' types of development. Small fields may require storage facilities, and then road tankers would transport the product to refineries.

7.4.2 Larger fields may require multiple wellhead sites which would be linked by pipeline. A gathering station, storage tanks, and transport links may be required where there were a number of well sites in a locality, or to deal with a number of products from different oilfields. This infrastructure would potentially have landscape and visual impacts, and the transport movements would result in carbon emissions.

7.4.3 Spillage of oil could result in pollution of soils, negative impacts on biodiversity, and pollution of surface and groundwater water. The integrity of the oil well would be crucial in preventing the pollution of groundwater. Negative impacts resulting from spillage and leakage of oil should be prevented via environmental permitting through the Environment Agency, while the issues such as impacts on the landscape would be considered and controlled through the planning process.

7.4.4 In recent years the environmental impacts of unconventional shale gas and oil (particularly gas in the UK) have received much publicity and public interest. For this reason in this paper the impacts are considered in more detail than those of conventional oil and gas, and coal extraction.

7.4.5 As with conventional oil and gas extraction, similar to 'heavy industrial' development there would be impacts noise impacts, landscape and visual impacts, and as a result of traffic.

7.4.6 A shale gas well will typically uses between 10,000 and 20,000 cubic metres (4 to 8 swimming pools) of water for hydraulic fracturing process[25] . Sources of this water would be mains, surface, and groundwater. This could have a detrimental impact on water supplies, particularly in the south east of England.

7.4.7 The extraction of shale gas and oil produces large quantities of waste material. It would be necessary for the drill cuttings (rock fragments and drilling mud) to be stored, transported and landfilled. Water, sand and chemicals are pumped into the well resulting in 'flowback' of water which contains natural minerals (some of which may be radioactive). The polluted water would obviously require collection and then to be contained on-site in closed tanks (not open ponds). The water would be treated on site, or at a water treatment works, and at multi-well developments the water would potentially be recycled and reused.

7.4.8 Groundwater contamination is an issue which has historically been raised in relation to hydraulic fracturing, however the fracturing typically would take place at 2000m to 3000m below the surface and the freshwater aquifers are at depths of less than 100m below the surface. This effectively means that there are thousands of metres of impermeable rock between drinking water and the fractures. In addition, the part of the well that is drilled through the aquifers has multiple casings and cement around it

[25] Planning Advisory Service, 2014, Planning on the doorstep - planning and the big issues: "Fracking"

which protects the groundwater. Therefore it is considered that the contamination of aquifers is very unlikely if best practice is followed.

7.4.9 Surface contamination could be as a result of oil or gas leakage, or uncontrolled discharges of (potentially contaminated) flowback water. This could potentially result in the contamination of groundwater, surface water and soils. In order to control these impacts impermeable bunded well pads should be constructed, and flowback water should be effectively contained. Good working practices and monitoring should also be employed.

7.4.10 The exploratory and operational phases of the development can also result in aerial emissions. During the exploratory works there would be no infrastructure in place to collect the gas so generally it would be 'flared' which releases carbon dioxide. In terms of accelerating climate change, methane is much worse than carbon dioxide so in this sense it is more environmentally friendly to flare the methane, although this results in light and noise impacts. During the construction period dust would be produced, and as part of the construction and throughout the operational part of the development. The construction phases of the development would often result in dust generation, while the HGVs and generators which would be required during the operational stages of the development would emit particulates and nitrogen dioxide. Fugitive emissions of methane mostly occur during well completion after fracking, when the flowback water comes back to the surface. Operators can control these emissions by using equipment that collects and separates the initial flow of water, sand and gas, and separates them so the gas can be utilised. Best practice and monitoring will obviously play a role in minimising emissions, and it is obviously not in the operator's interest to flare the gas, but to collect it. There is UK and EU legislation on emissions which the operators will be required to adhere to.

7.4.11 Earthquakes felt at surface level induced by hydraulic fracturing are considered to be a very rare occurrence. Of over 35,000 hydraulically fractured wells there have only been three noticeable earthquakes: Oklahoma in 1979, Blackpool/Preese Hall in 2011, and British Columbia in 2012. The DECC 'Traffic light monitoring system' tries to guard against earthquakes resulting from hydraulic fracturing by obligating operators to assess the location of faults before 'fracking', monitor seismic activity in real time, and stop if even minor earth tremors occur.

7.4.12 Surface (opencast) extraction of coal has many of the same potential impacts as a quarrying operation, for example noise, particulates, landscape and visual, and traffic. Coal operations would often have a higher proportion of overburden than other quarrying activities however and this can present problems in terms of disposing of this spoil. Usually this spoil material would be used to create screening bunds and would be deposited back into the void for restoration.

7.4.13 Deep (underground) mining raises a number of planning issues associated with the need for an industrial / transport complex at the minehead, and the method of disposal of the associated colliery waste. This again would potentially result in noise, particulates, landscape and visual, and traffic.

7.5 Conclusions on Energy Minerals for the MWLP

7.5.1 For the reasons outlined in this evidence document, it is currently considered very unlikely that coal, or oil and gas (conventional or unconventional) would be extracted from within West Berkshire over the Plan period.

7.5.2 It is not however, beyond the realms of possibility that a hydrocarbon resource in or near West Berkshire could be found to be economically viable in the future and then an application for the extraction of hydrocarbons could come forward over the plan period. It is therefore considered necessary to have adequate policies in place to minimise the adverse effects of possible future extraction of energy minerals. In order to achieve these safeguards, it is proposed that criteria based development management policies be developed, against which any application for the extraction of coal, or oil and gas would be considered. This policy approach was supported by respondents to the Issues and Options consultation.

7.5.3 It is intended that a specific policy for considering 'Energy Minerals' development proposals be included within the MWLP.

8.0 Chalk and Clay

8.1 Introduction

8.1.1 Chalk and Clay are two non-construction, non-energy minerals that are known to exist, and have previously been worked, in West Berkshire. It is understood that until the 20th Century, chalk and clay were the main minerals produced in the area, and this is thought to have been to meet local needs.

8.1.2 Chalk deposits are broadly located to the north of West Berkshire. It is understood that historically pulverised chalk was used as a liming agent for agricultural land, and sometimes as 'fill' material in civil engineering projects. Much of the area where the chalk deposits exist in West Berkshire are within the North Wessex Downs Area of Outstanding Natural Beauty (AONB).

8.1.3 Clay deposits (London Clay) are located along the Kennet Valley to the east of Thatcham, with some more limited areas surrounding Newbury to the north, west and south. It is understood that historically these deposits have been used for brick and tile making, and more latterly for lining landfill sites.

8.1.4 There are currently no active sites in West Berkshire that extract either chalk or clay, and since the adoption of the Replacement Minerals Local Plan for Berkshire in 1995 there have been no planning applications received for the extraction of these minerals in West Berkshire. There has been minimal interest in the potential exploitation of such minerals in recent years. This lack of historic interest does not preclude sites coming forward in the future, however, no sites for chalk or clay extraction were submitted to the Council for consideration through the "Call for Sites" process that took place as part of the development of the MWLP.

8.1.5 It is not precisely known why there appears to be a lack of demand for chalk and clay. It may be due to a lack of a market for these minerals or the fact that 74% of West Berkshire is AONB. There is no evidence to indicate that chalk or clay are of local or national importance at this time, and there is no evidence that this situation is likely to change over the life of the emerging MWLP.

8.2 Planning Policy Context

National Policy

8.2.1 There is no national requirement to maintain a landbank for chalk or clay, although the NPPF does require Mineral planning authorities to plan for a steady and adequate supply of industrial minerals including at least 15 years for cement (chalk and limestone) and secondary (clay and shale) materials to maintain an existing plant (NPPF para 208).

8.2.2 Paragraph 205 of the NPPF sets out the environmental criteria, against which planning applications will be assessed to ensure that permitted operations do not have unacceptable adverse impacts on the natural and historic environment and human health. The paragraph also requires that cumulative effects are taken into consideration.

Existing Local Policy

8.2.3 The Replacement Minerals Local Plan for Berkshire provided a policy approach, allowing for proposals to be worked where the minerals are required to meet a specific local need which cannot be met from elsewhere and where this need outweighs any other environmental, agricultural, amenity or other planning constraints.

8.3 Conclusions on Chalk and Clay for the MWLP

8.3.1 Given the reasons outlined, it is currently considered very unlikely that there will be any applications for the extraction of chalk or clay over the life of the MWLP. As such it would be inappropriate to map the 'viable resources' or identify 'strategic areas' for development or identify safeguarded areas for these minerals.

8.3.2 It is possible that there might be a small number of small scale proposals that come forward over the life of the plan. It is therefore considered necessary to have adequate safeguards in place to minimise the adverse effects of possible future extraction of these minerals. In order to achieve these safeguards, it is proposed that criteria based development management policies be developed, against which any application for the extraction of chalk or clay would be considered. This policy approach was supported by respondents to the Issues and Options consultation.

Appendix A: Soft Sand Consumption Estimates

These methods outline alternative approaches to estimating the level of consumption of soft sand within West Berkshire.

Method 1: Projected Housing and Other Construction Demand – Estimate from Construction Materials

In terms of future demand for housing in West Berkshire, the latest AMR suggests that there is a need to deliver an additional 525 dwellings per annum to meet the target of at least 10,500 homes in West Berkshire over the 20 year plan period (to 2026) set out in the adopted Core Strategy.

The West Berkshire Council AMR 2014 confirms that the average number of bedrooms per household in West Berkshire is 3 (based on 2011 census data). The West Berkshire Council AMR 2013 confirmed that the majority of dwellings in West Berkshire built in 2012/13 were 4 or more bed houses (table 4.23). However this table in the AMR also confirms that around 80% of all properties completed in 2012/13 were smaller than 3 bed houses, being 2 and 1 bed houses and 2 and 1 bed flats.

As such it has to be recognised that there are a significant number of semi-detached properties, terraced properties and flats, all of which would use less mortar by virtue of a reduction in exterior walls and a significant number of houses that have less than 3 bedrooms. Therefore the use of a 3 bed detached property is considered by the Authority to be a robust approach that is more likely to over-estimate the demand for building sand based on housing completions.

Using an online construction material calculator[26] the has Council calculated that volume of building sand required to construct a 3 bed detached house with walls 8.6 by 5.6 by 5.8 is 15 tonnes.

However it is accepted that not all housing constructed will have the same level of need for building sand with some properties requiring more building sand and some requiring less. In addition some builders use the “industry standard” of 4 parts building sand to 1 part cement to produce mortar, others use a ratio of 5:1(this worse case approach has been used to derive the 15 tonnes figure). It is also accepted that there will be an element of wastage and adjustments conversions of net volumes to gross volumes.

The Council considers that a figure of 15 tonnes of building sand for the construction of an “average house” is a suitably robust and likely to be a more generous figure than the actual average volume required to construct a new dwelling.

Using the figure of 15t of building sand required per dwelling this equates to a need for around 7,875 tonnes of building sand per year to achieve the requirements of the adopted West Berkshire Core Strategy (using the 525 dwellings per annum target).

West Berkshire Council is in the process of developing a New Local Plan, which will assess and seek to meet the housing and employment needs of the authority to 2037. This plan is under development and will result in a need to enhance the planned provision for housing (the Strategic Housing Market Assessment (SHMA) gives West Berkshire a need for an average of 665 new dwellings a year). If the figure of 665 new dwellings per year is used this would equate to a demand for around 9,975 tonnes of building sand per year to achieve these requirements.

[26] https://source4me.co.uk/calculate_brick_mortar.htm

The Council recognises that new housing is only one element of demand for construction aggregates. Other demand from non-housing development such as infrastructure and industrial and commercial buildings and repair and maintenance of existing infrastructure places a demand on aggregates. The ONS Output in the Construction Industry dataset[27] shows that on average over the period 2008 – 2017, housing accounted for 31% of the value of construction output in Great Britain and other non-housing development accounted for 71% of the value of construction output (these figures include repair and maintenance). Using this to estimate the demand for soft sand from non-housing development amounts to 17,528 tonnes at 525 dwellings per year, and 22,202 tonnes at 665 dwellings per year.

In total, this would equate to demand for between **25,403 tonnes** (at 525 dwellings per year) and **32,177 tonnes** of soft sand in the district.

Method 2: Projected Housing and Other Construction Demand - Estimate from UK Soft Sand Demand

The Minerals yearbook published by BGS confirms that in 2014[28] the UK produced 171,400,000 tonnes of aggregates (see Aggregates table on page 14 and it goes on to confirm at page 62 that 6,920,000 tonnes of building sand was consumed in the UK in 2014). This equates to around 4%, as such it could be broadly stated that it is therefore reasonable to assume that of all aggregates required in the UK around 4% is building sand.

As discussed the most up to date evidence for housing demand in West Berkshire suggests there is a need to deliver 665 homes per year to meet future demand. Using a generic figure of 55 tonnes of aggregates required per dwelling (midway between the 50 - 60 tonnes quoted by BGS and the MPA) this would equate to 36,575 tonnes of aggregates per year needed to deliver this level of new housing.

Using 36,575 tonnes of aggregates per year for new housing to calculate demand for aggregates from non-housing construction, (71% of total value of construction output as detailed in Method 1), would amount to 81,408 tonnes. In total this would equate to demand for 117,983 tonnes of aggregates in the district.

As detailed above, approximately 4% of all aggregates used is building sand and as such the demand for soft sand for West Berkshire using this calculation method would equate to **4,719 tonnes** per annum.

Method 3: Using Population to Calculate Demand

Another way to calculate demand would be to use population as a proxy to demand. Based on the fact that the population of West Berkshire is circa 0.249% of the population of Great Britain in 2014, then if this percentage (rounded up to 0.25%) is applied to the total building sand (including both building sand for construction and asphalting) sales in Great Britain in 2014 (6,960,000) then this would equate to a demand for **17,400 tonnes** per annum.

If this calculation is revisited to remove the building sand used in asphalting (1,170,000 tonnes) then this suggests that the level of demand at the UK level for building sand of the type found in West Berkshire, would be in the region of 5,912,800 tonnes. Taking the approach that the population of West Berkshire is 0.25% of the total population of the UK suggests that the level of demand for Soft Sand in West Berkshire is **14,475 tonnes**.

[27] https://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputintheconstructionindustry
[28] https://www.bgs.ac.uk/mineralsUK/statistics/ukStatistics.html

Appendix B: Estimate of West Berkshire Primary, Recycled & Total Aggregate Consumption 2006 - 2018

Year	Primary Aggregate Sales in Great Britain (Sand and Gravel and Crushed Rock)	Great Britain Population	Great Britain Primary Aggregate Consumption per head (t)	West Berkshire Population	Est. West Berkshire Estimated Primary Aggregate Consumption	Estimated Recycling Percentage for Great Britain[29]	Estimated Recycled Aggregate Consumption (t)	Est. Total Primary and Recycled Aggregate Consumption for West Berkshire (t)
2006	207,137,000	59,083,854	3.51	149,153	522,903	25%	174,301	697,204
2007	208,078,000	59,557,392	3.49	150,086	524,361	25%	174,787	699,148
2008	187,256,000	60,044,620	3.12	151,020	470,973	27%	174,196	645,169
2009	146,812,000	60,467,153	2.43	151,954	368,939	28%	143,476	512,415
2010	136,639,000	60,954,623	2.24	152,888	342,722	28%	133,281	476,002
2011	145,943,000	61,470,827	2.37	153,822	365,202	29%	149,167	514,368
2012	132,930,000	61,881,396	2.15	154,486	331,858	29%	135,548	467,405
2013	134,358,000	62,275,929	2.16	155,394	335,257	28%	130,378	465,634
2014	154,552,000	62,756,254	2.46	155,732	383,527	29%	156,652	540,178
2015	169,969,000	63,258,413	2.69	157,460	423,079	29%	172,807	595,886
2016	176,851,000	63,785,917	2.77	158,576	439,663	29%	179,581	619,244
2017	176,280,000	64,169,395	2.75	158,473	435,342	30%	186,575	621,917
2018	179,935,000	64,553,900	2.79	158,527	442,290	29%	180,654	622,944

Source: AMRI Surveys 2002 – 2014, BGS Minerals Yearbook 2018, ONS (population data)

[29] Average difference between total aggregates and recycled aggregate for Great Britain, Market summary 1955 to 2012, MPA 2013 (email dated 16th August 2013).
MPA Sustainable Development Reports: https://mineralproducts.org/sustainability/reports.html

Appendix C: Estimate of West Berkshire Recycled Construction, Demolition and Excavation Waste 2014 - 2018

Modified Defra (2012) Methodology for Estimating CDE Waste Arising in West Berkshire 2014 – 2018

	2014	2015	2016	2017	2018	Notes
Waste dealt with by transfer & treatment facilities:	**24,804**	**28,673**	**50,083**	**27,029**	**15,915**	
Transfer	17,816	16,264	31,065	11,200	5,919	Only included input to transfer sites outside of West Berks, because the onward movement of waste from these facilities will no longer record West Berkshire as the origin. Waste to transfer facilities within West Berks will be covered by final disposal/treatment in other steps. Source: WDI
Treatment	2,100	3,926	10,143	5,217	9,996	Only included sites outside of West Berks, as waste recycled as product (aggregates, soil) within West Berks included in Step 4. Source: WDI
MRS	2,817	1,702	1,283	1,040	525	Source: WDI
CDE waste recoded as Ch. 19 12 12 at transfer facilities and disposed.	2,071	6,781	7,592	9,572	8,993	Included transfer facilities within plan area to account for waste that is received as Ch. 17 and recoded as 19 12 12. This was done by applying the proportion of CDE waste from West Berkshire at transfer sites within West Berks managing Ch. 17 waste and producing Ch. 19 waste to the total 19 12 12 output. Source: WDI
Waste deposited to land:	**103,672**	**162,916**	**174,396**	**168,966**	**115,156**	
Landfill	101,341	51,897	78,373	87,019	78,700	Source: WDI

On/In land	2,331	111,019	96,023	81,947	36,456	Includes waste managed at formerly exempt sites. Source: WDI
Waste dealt with under Exemptions	21,200	21,200	21,200	21,200	21,200	The most common exemption dealing with CDE waste is a 'U1' exemption which allows use of waste to be used in construction without requiring a permit. A report produced for WRAP[30] estimated the mean value for U1 exemptions is 600t. The nature of these exemptions is that they are generally only used once, i.e. as a one-off exercise. The number of U1 exemptions in West Berkshire was obtained from the Environment Agency's Register of Waste Exemptions[31]. Each registration lasts for 3 years, and so the total number of exemptions registered in the last 3 years was calculated (106) and multiplied by 600. This was then divided by three to give an approximate annual estimate, giving the figure shown.
Waste recycled as aggregate	156,454	152,533	179,935	167,248	117,924	Estimated from aggregates monitoring survey (including that recycled for non-aggregate use, e.g. construction fill) by multiplying total recycled product with estimated percentage originating in West Berkshire). Source: SEEAWP Aggregate Monitoring Surveys/Authority Annual Waste Surveys.
Berkshire and South East Unattributed Share	133,138	134,774	143,827	74,176	67,376	To account for a share of waste that has not been attributed below 'Berkshire or 'South

[30] WRAP, (2013). *Review of the factors causing waste soil to be sent to landfill, 2007 to 2011.* [online] Available at: http://www.wrap.org.uk/sites/files/wrap/CIS101-301%20Final%20Report%20final%2017%20april%2013.pdf [Accessed 05 Feb 2019].
[31] Environment Agency, (n.d.a.). *Register of Waste Exemptions.* [online] Available at: [31]https://environment.data.gov.uk/public-register/view/search-waste-exemptions [Accessed 05 Feb 2019].

						East'. See Local Waste Assessment for methodology.
TOTAL (tonnes)	**439,268**	**500,096**	**569,441**	**458,619**	**347,089**	

Assume CDE Arisings = ∑ waste dealt with by transfer & treatment facilities + waste deposited to land + waste dealt with under exemptions + waste recycled as aggregate. Use EWC codes from Ch. 17, excluding hazardous (assume 20 02 02 (soil and stones) and 19 12 09 (minerals, for example sand, stones) covered by C&I estimate).

If you require this information in an alternative format or translation, please call 01635 42400 and ask for the Minerals and Waste Planning Policy Team.

West Berkshire Council
Development and Planning
Council Offices
Market Street
Newbury
RG14 5LD
T: 01635 519111
F: 01635 519408
E: mwdpd@westberks.gov.uk
www.westberks.gov.uk/mwlpps

WBC/P&C/CP/1213